EVOLUTION OF GENES AND GENE NETWORKS IN FILAMENTOUS FUNGI

A Dissertation

by

CHARLES JOAQUIN GREENWALD

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2010

Major Subject: Genetics

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Approved by:

Chair of Committee,	Heather H. Wilkinson
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ABSTRACT

Evolution of Genes and Gene Networks in Filamentous Fungi.

(August 2010)

Charles Joaquin Greenwald, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Heather H. Wilkinson

The Pezizomycotina, commonly known as the filamentous fungi, are a diverse group of organisms that have a major impact on human life. The filamentous fungi diverged from a common ancestor approximately 200 – 700 million years ago. Because of the diversity and the wealth of biological and genomic tools for the filamentous fungi it is possible to track the evolutionary history of genes and gene networks in these organisms. In this dissertation I focus on the evolution of two genes (*lolC* and *lolD*) in the *LOL* secondary metabolite gene cluster in *Epichloë* and *Neotyphodium* genera, the evolution of the MAP kinase-signaling cascade in the filamentous fungi, the regulation of the gene networks involved in asexual development in *Neurospora crassa*, and the identification of two genes in the *N. crassa* asexual development gene network, *acon-2* and *acon-3*. I find that *lolC* and *lolD* originated as an ancient duplication in the ancestor of the filamentous fungi, which were later recruited in the *LOL* gene cluster in the fungal endophyte lineage. In the MAP kinase-signaling cascade, I find that the MAPK component is the most central gene in the gene network. I also find that the MAPK signaling cascade originated as three copies in the ancestor to eukaryotes, an

arrangement that is maintained in filamentous fungi. My observations of gene expression profiling during *N. crassa* asexual development show tissue specific expression of genes. Both the vegetative mycelium and the aerial hyphae contribute to the formation of macroconidiophores. Also, with the help of genomic tools recently developed by researchers in the filamentous fungal community, I identified NCU00478 and NCU07617 as the genes with mutations responsible for two aconidial strains of *N. crassa*, *acon-2* and *acon-3* respectively.

DEDICATION

To my dad, and anyone that I am unable to thank.

הוא היה אומר

אם אין אני לי מי לי

וכשאני לעצמי מה אני

ואם לא עכשיו אימתי

Pirkei Avot 1:14

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Finally, I thank my family, including my children, Sam and Jack, for their laughs and good humor, my mom for her belief in me, and my north star, Jessie.

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CHAPTER I

INTRODUCTION

The Pezizomycotina, a subphylum within the phylum Ascomycota, commonly known as the filamentous fungi, are a diverse group of important organisms. There are over 60,000 species representing between 210 and 707 million years of evolutionary history within this subphylum (Taylor and Berbee, 2006). To put this time scale into perspective, 200 million years corresponds to the initial breakup of the Pangaea supercontinent; 550 million years ago corresponds to the Cambrian explosion and the colonization of land by plants, animals, and fungi; and 700 million years ago, life was limited to aquatic environments. Pezizomycotina is divided into 10 classes. Species in this group have a major impact on human life, both positive and negative. They include the model organism, *Neurospora crassa*, where mechanisms essential to our understanding of genetics have been elucidated (e.g. one-gene-one-enzyme hypothesis) (Beadle and Tatum, 1941).

Pezizomycotina include pathogens that afflict humans, domesticated animals, and crops. For instance, it is estimated that approximately 20 to 25 percent of the entire human population carries a dermatophytic fungal infection (Ali et al., 2009). Chestnut blight, which decimated the population of the east coast American chestnut tree, is

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This dissertation follows the style of Fungal Genetics and Biology.

caused by the filamentous Ascomycete, *Cryphonectria parasitica* (Anagnostakis, 1987).

The secondary metabolites of fungi are extremely important to humans, as well. For instance, since 1930, β-lactam antibiotics have been a staple for treating infectious disease (Wainwright and Swan, 1986). Another, cyclosporin, is a immunosuppressant used in the treatment of transplant patients and others with autoimmune disorders (Stähelin, 1996). On the other hand, some fungi produce classes of secondary metabolites, called mycotoxins. Mycotoxins can contaminate plant material used as food for humans or feed for domesticated animals. For instance, aflatoxins, which can be found on nuts and cereal grains, are the most potent carcinogens know to man (Squire, 1981).

As a result of the new technologies in the last decade, an explosion of genome data for species within the Pezizomycotina allows us to answer questions that were previously impossible. Among these new technologies, high throughput DNA sequencing of entire genomes has allowed us to characterize the genetic diversity of the filamentous fungi, and make inferences based on their lifestyles. There are currently over 50 sequenced fungal genomes, spanning the genetic and ecological diversity within the kingdom, that are publically available. Furthermore, high throughput sequencing combined with transcriptome studies have allowed us to look at the genome-wide expression of mRNA (transcriptome analysis). The availability of this variety of sequence data provides for gene network analysis on these fungi.

A gene regulatory network, or gene network, is the collection of individual "modules" that work together to regulate a set of genes that must be expressed in a

specific pattern, both in space and time. Each module also is a gene product, encoded by a unique DNA sequence. These modules may receive multiple inputs, and the end result is to elicit a change in downstream transcription levels. (Davidson and Levin, 2005). In the context of gene evolution, gene networks act in interesting ways. Genes in a network are likely to be co-regulated (Voy et al., 2006). Since all genes in a network work together to produce a given phenotype, evolutionary pressures will not act on each gene individually, but on the network as a whole. As a result, certain patterns of evolution for genes that are in a network emerge. First, genes central to a network encode proteins with more connections to other proteins in a network, called hub proteins. Since hub proteins are more important to the network, they are more likely to undergo slower rates of evolution (Fraser et al., 2002). Second, hub proteins are more likely to be essential (i.e. lethal if knocked out) (Jeong et al., 2001) because they are central to so many processes.

Another layer of complexity is the possibility of duplication of the network, or genes within the network. This creates opportunities for the duplicated network, or genes within, to undergo three fates. The *first fate* is loss of the duplication. In the absence of an immediate fitness advantage, a duplicated network or gene is redundant to the organism. One way the network or gene could be "lost" would be accumulation of mutations due to the relaxed selection pressure on the redundant copy. Another might be through genetic events that ameliorate or correct the duplication (e.g. gene conversion between tandem duplicate genes) The *second fate* is subfunctionalization. Subfunctionalization is where the paralogous (copies) genes (or network) take on

separate portions of the role that the single gene (or network) performed originally. The *third fate* is neofunctionalization. Neofunctionalization is the process whereby accumulated mutations lead to an entirely new gene or gene network function. A central theme to this dissertation is the evolution of genes and gene networks involved in fungal secondary metabolism, signal transduction, and asexual development.

The filamentous fungi are a genetically diverse group of organisms. It has been estimated that the time scale for the divergence of *Aspergillus nidulans* and *N. crassa*, two model organisms from different classes (Eurotiomycetes and Sordariomycetes respectively) is between 210 and 707 million years (Taylor and Berbee, 2006), which again represents the divergence of the Pezizomycotina. In contrast, the time scale for the divergence of humans and fish is estimated to be approximately 450 million years (Hedges, 2002). Even within "closely related" species, unique patterns of genetic diversity; based on adaptation to environmental conditions, emerge. For instance, the average amino acid identity between *N. crassa* and *Podospora anserina,* both Sodariomycetes (Fig. 1), is the same as the average amino acid identity between humans and fish (Espagne et al., 2008). However, *N. crassa* and *P. anserina* are estimated to have diverged only 75 million years ago (Saupe et al., 2000). The relatively short generation time of fungi, and the adaptation of *P. anserina* to its coprophagic (subsistence on feces) lifestyle, as compared to *N. crassa*'s saprophytic (subsistence on detritus) lifestyle, may explain such rapid amino acid divergence. Figs. 1 and 2 are phylogenetic trees for the filamentous fungi. Fig. 2 shows the 10 major classes of the

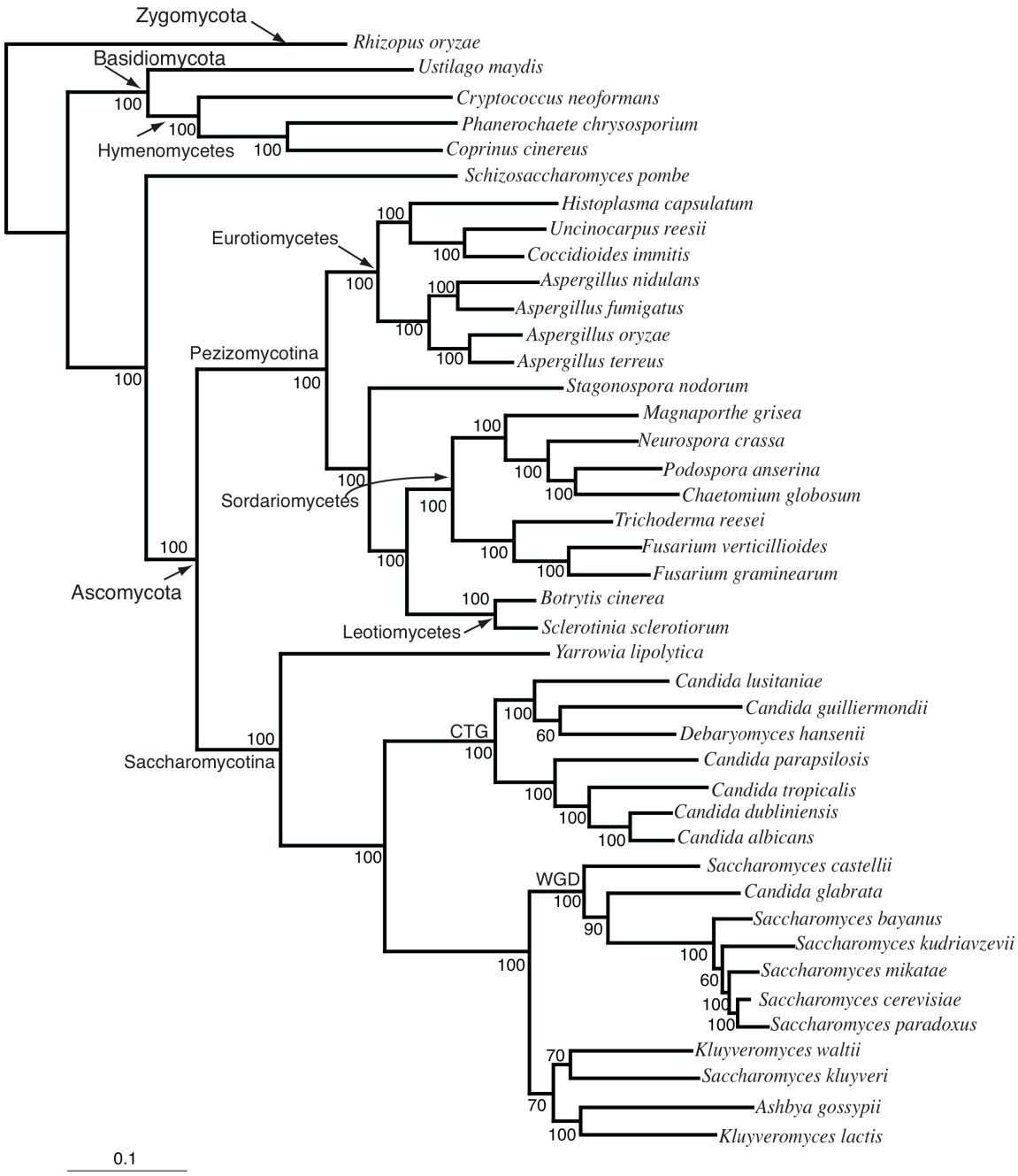

Fig. 1: Phylogenetic tree assembled from fungi with sequenced genomes. Reproduced with permission from Fitzpatrick et al., 2006.

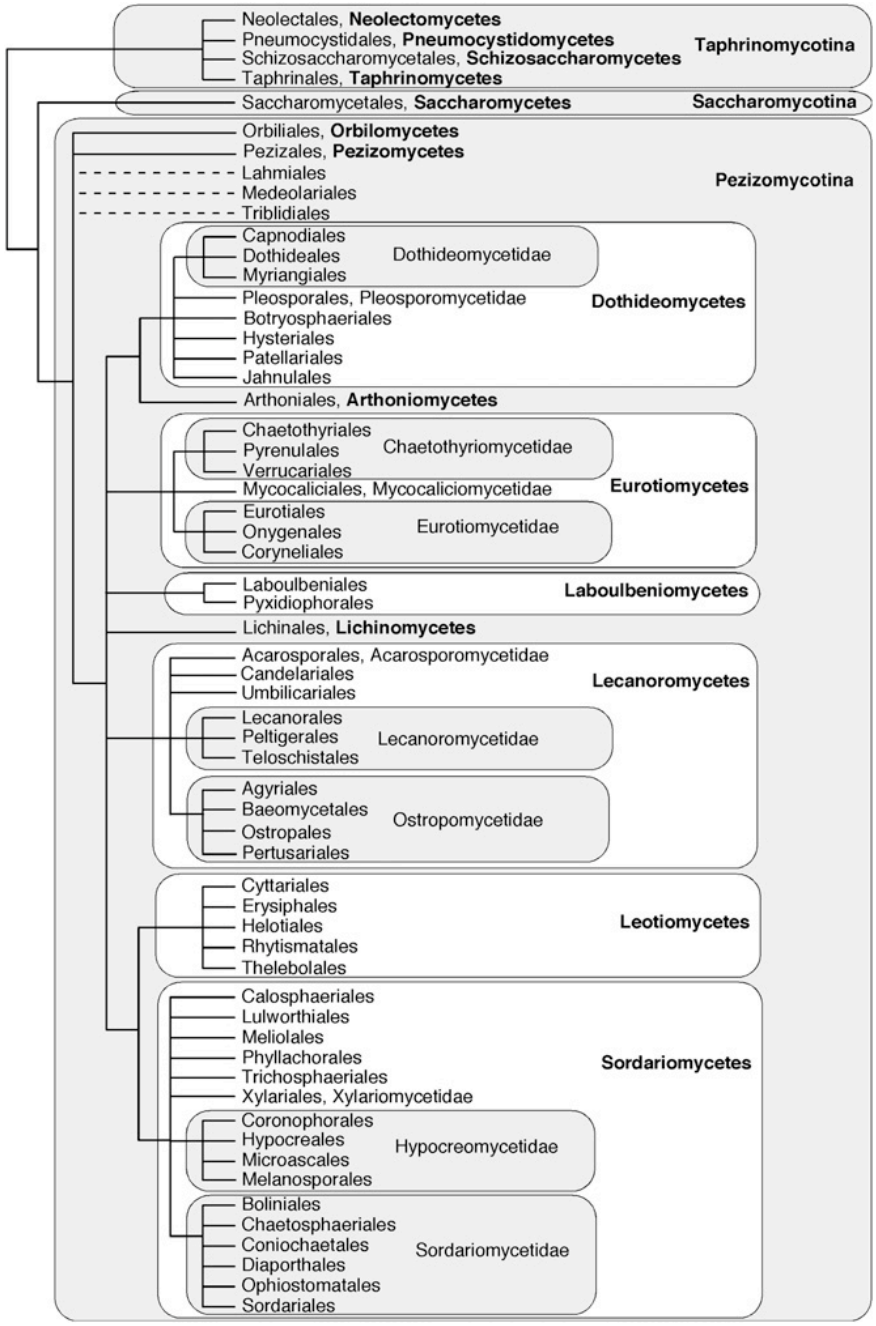

Fig. 2: Phylogenetic tree showing the diversity of classes within the Pezizomycotina. The Pezizomycotina are a subphylum of Ascomycota, commonly referred to as the filamentous fungi. Dashed lines represent taxa with uncertain placement. Reproduced with permission from Hibbett et al., 2007.

phylum Ascomycota. Fig. 1 is constructed from sequence available from fungal genome projects. Thus, the species within the tree are from important, well-characterized and/or model systems (Fitzpatrick et al., 2006). Throughout the studies in this dissertation, data from these species representing the diversity of the fungi are used for comparison. For example, in the studies involving the mitogen activated protein kinase gene network, we chose the species *A. nidulans* (saprophyte), *Botrytis cinerea* (necrotrophic plant pathogen), *Chaetomium globosum* (plant and soil associated), *Fusarium graminearum* (cereal grain pathogen), *Magnaporthe grisea* (rice blast fungus), *N. crassa* (saprophyte), *Aspergillus fumigatus* (saprophyte/immunocompromised human pathogen), and *Sclerotinia sclerotiorum* (necrotrophic plant pathogen). These species span fairly representative ecological and phylogenetic diversity and have well-developed genome sequence resources. Similarly, *Saccharomyces cerevisiae* (Baker's yeast), *Ustilago maydis* (corn smut fungus), and *Cryptoccocus neoformans* (animal pathogen), are used as outgroups to help resolve phylogenetic inferences within the Pezzizomycotina.

Given the impact that these fungi have on human life, and the utility of these systems as models for genetics of eukaryotic systems, studies characterizing the genetic basis of adaptation in fungi are important. In each of the four studies described in this dissertation, the genetic basis of a trait is considered in the context of the available genome data for filamentous fungi. Chapter II describes a study of the evolutionary history of two genes in a secondary metabolite gene cluster responsible for roles in the loline biosynthetic pathway of *Epichloë and Neotyphodium* species. Two genes *lolC* and *lolD* were of interest because: 1) lolines are unique to these closely related species; and

2) both genes are homologous to essential genes involved in primary metabolism. Thus, it seems reasonable to expect a study of the evolution of these genes would provide insight both specifically into the evolution of the *LOL* secondary metabolite cluster, and also more generally into a model for how a fungal secondary metabolite cluster might evolve.

Chapter III focuses on an analysis of the evolution of the mitogen activated protein (MAP) kinase signaling pathways across filamentous fungi. These pathways are involved in controlling genetic responses to environmental cues and are conserved across eukaryotic systems. Thus, given the number of fungal genome sequences available it is possible to trace the evolution of this gene family within a large taxonomic group and make inferences about both the evolutionary rate and the congruence of these gene family trees with established phylogenies for the species analyzed. In Chapter IV we use microarrays to profile the *N. crassa* transcriptome during asexual sporulation (conidiation). Transcriptional profiling provides for identification of co-regulated genes. These lists of co-regulated genes are the basis for identification of new candidate components (e.g. targets of regulators) in gene networks. Thus, capturing and interpreting data that accurately reflect co-regulation is essential for building and testing hypotheses for the mechanistic basis of gene network function. Finally, characterization of candidate genes provides for proof of involvement in a phenotype. Chapter V describes the identification of the genes responsible for two previously established aconidial mutants of *N. crassa*, *acon-2* and *acon-3*.

CHAPTER II

EVOLUTION OF THE LOLINE BIOSYNTHETIC GENES *lolC* AND *lolD*

Introduction

Secondary metabolites can be defined as organic compounds that are secondary (not essential) to the growth, reproduction, or development of the organism. However, it is reasonable to expect that these compounds are important to the fitness of the organism, especially under niche specific environmental conditions. Secondary metabolites have been shown to aid in disease resistance, predator defense, and reproductive strategies (Adams et al., 1998). Usually the production of any given compound is restricted to closely related groups of fungi (Kroken et al., 2003). Some examples include antibiotics, certain fatty acids, alkaloids, non-ribosomal peptides, and polyketides. Loss of these compounds may have no observable phenotypic consequences in vitro, but presumably compounds that are maintained in natural populations convey some selective advantage under some set of environmental conditions. For humans, secondary metabolites are important due to the fact that many are used in pharmacological settings or they have toxic affects (e.g. penicillin and aflatoxin).

In fungi, the genes involved in the biosynthesis of secondary metabolites are frequently clustered in the genome. The "selfish cluster" hypothesis is a model of secondary metabolite gene clusters (Walton, 2000). This model proposes that genes are clustered to promote their own continuation and dispersal, independent of the selective

advantage they provide to the host organism. Genes that are closely linked across a short segment of DNA have a greater chance of being dispersed as a small unit during a horizontal gene transfer event within or between species, whereas, unlinked genes can only be passed on together by vertical transmission, either sexually or asexually (Zhang et al., 2004). Horizontal gene transfer in prokaryotes consists of the uptake of foreign genetic material, either by transformation, transduction, or conjugation. Despite the fact that there is a scarcity of well-supported evidence that this is a common process in eukaryotes, Walton (2000) favors this as a mechanism to explain the evolution of gene clusters in fungi. Generally speaking, two major pathways for evolution of novel gene functions are 1) horizontal gene transfer with novel function into a genome without it (e.g. as in the selfish cluster hypothesis), and 2) gene duplication with subsequent change of one copy through accumulation of mutations.

Horizontal gene transfer (HGT) is a well characterized occurrence in prokaryotes (Gogarten et al., 2002). In eukaryotes, fewer documented cases exist. Some notable examples are the transfer of genetic information from the plant pathogen *Agrobacterium tumefaciens* to the host plant (Zhu et al., 2000), the transfer of genetic material from mitochondria and chloroplasts to chromosomes in the nucleus (Gray, 1993), and the large telomere region concentration of foreign DNA in bdelloid rotifers (Gladyshev et al., 2008). Of the different types of HGT in eukaryotes, prokaryotic-to-eukaryotic appears to be the most common. This could be for a variety of reasons, including the difficulties of detecting eukaryotic-to-eukaryotic HGT (Keeling and Palmer, 2008). Keeling and Palmer (2008) also indicate that to detect horizontal gene transfer events a

sufficient taxonomic sampling, which in many cases is not available, must be evaluated to confirm cases of suspected HGT. Nevertheless, after a gene transfer event, it is reasonable to expect that the transferred gene would face evolutionary pressures similar to a gene that was duplicated within a genome, as compared to the parent gene.

Three outcomes of gene duplication can be expected: neofunctionalization, subfunctionalization, or gene loss. Subfunctionalization is the process whereby duplicated genes take on independent portions of the original gene function. Neofunctionalization is a process whereby one copy of a duplication event develops a novel gene function. Rapid subfunctionalization followed by neofunctionalization (subneofunctionalization) has emerged as a model for the primary source of genetic diversity and new gene function (He and Zhang, 2005). After a duplication event, if there is not selection for a) both copies to maintain the original function (e.g. a greater dosage is adaptive) or b) for subfunctionalization, then one of the duplicate gene copies experiences either relaxed selective pressures or directional selection away from the original gene function. Through random mutations, this gene will either become nonfunctional (gene loss) or evolve a new function. Gene loss is the most likely event to occur after a duplication (Lynch and Conery, 2000).

Previous studies of the loline biosynthesis gene cluster

The fungal endophytes of pooid grasses (family Poaceae), *Epichloë* and *Neotyphodium* spp., produce four different classes of symbiosis-specific alkaloids, including the insecticidal loline alkaloids (Schardl et al., 2007; Young and Wilkinson, 2010). *LOL*, a cluster of up to 10 genes encoding the biosynthesis of lolines, has been

described for several endophyte species (Kutil et al., 2007; Spiering et al., 2005). Two genes found within the *LOL* cluster, *lolC* and *lolD*, are of particular interest. The predicted protein produced by *lolC* is homologous to a homocysteine synthase/O-acetyl-homoserine thiol lyase (OAH), while *lolD* produces a protein that is homologous to ornithine decarboxylase (ODC). Both proteins are pyridoxal-5'-phosphate (PLP) dependent enzymes. PLP binding enzymes may be the most ancient extant proteins, with four independent lineages of paralogous proteins present in all major lineages of life (Christen and Mehta, 2001). OAH and ODC each play roles in primary metabolism and are thus essential for normal growth and survival of an organism. The *oah* and *odc* from loline producing *Neotyphodium* and *Epichloë* species were identified and cloned, thus allowing phylogenetic (gene family) analysis for these genes, the *lol* genes, and the primary metabolism genes within the same family (Fig. 3) (Kutil, 2006). We reasoned that tracking the evolution of these *lol* genes, relative to these gene families present in a wide diversity of taxa, could provide insight into the origin and evolution of the cluster itself. Kutil (2006) established that both LolD and LolC originated in fungal lineages (Fig. 3). This precludes their origins as prokaryotic "orphans". Kutil (2006) also observed long branches for the LolC and LolD clades within their respective gene family phylogenies. This suggests a rapid rate of evolution, which is also indicative of neofuctionalization. However, at the time, no other paralogs to the primary metabolism genes were found in sequenced genomes. This made *lolD* and *lolC* appear as "orphans" of fungal origin in endophytes. Furthermore, Kutil (2006) observed that intron positions

in *lol*C and *lol*D were closer to the intron organization of the primary metabolism paralogs of fungal lineages other than endophytes.

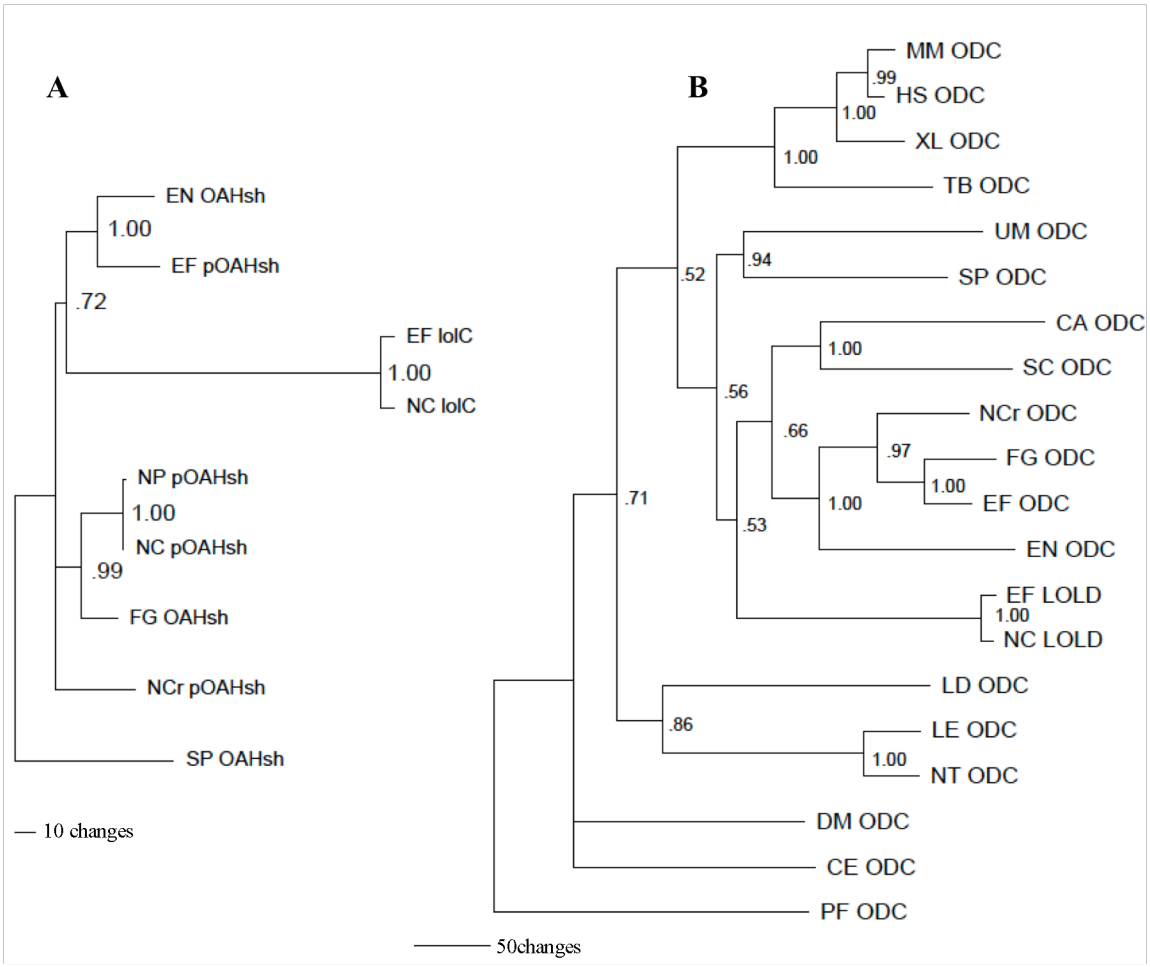

Fig. 3: Bayesian trees for endophyte OAH, ODC, LolC, and LolD. A. Bayesian tree for endophyte LolC and fungal OAHsh sequences. B. Bayesian tree of endophyte LolD and eukaryotic ODC sequences**.** Posterior probabilities over 0.50 are given next to each node. Species abbreviations and protein accession numbers are provided in Table1. Posterior probabilities greater than 0.50 are indicated next to each node. Reproduced with permission from Kutil, 2006.

Table 1: Species binomen and accession numbers for taxa in ODC and OAHsh gene family trees. Reproduced with permission from Kutil, 2006.

Label	Full name	Accession number[a]
CA_ODC	*Candida albicans*	P78599
CE_ODC	*Caenhabditis elegans*	AAB18317
DM_ODC	*Drosophila melanogaster*	P40807
EN_ODC	*Emericella nidulans*	EAA59111
EF_ODC	*Epichloe festucae*	EF015404
EF_LolD	*Epichloe festucae*	EF012267
FG_ODC	*Fusarium graminearum*	EAA75548
HS_ODC	*Homo sapiens*	P11926
LD_ODC	*Leishmania donovani*	P27116
LE_ODC	*Lycopersicon esculentum*	O22616
MM_ODC	*Mus musculus*	P00860
NC_LolD	*Neotyphodium coenophialum*	EF012268
NCr_ODC	*Neurospora crassa*	P27121
PF_ODC	*Plasmodium falciparum*	O15696
SC_ODC	*Saccharomyces cerevisiae*	P08432
SP_ODC	*Schizosaccharomyces pombe*	CAB45689
TB_ODC	*Trypanosoma brucei*	P07805
UM_ODC	*Ustilago maydis*	O14439
XL_ODC	*Xenopus laevis*	P27120
EN_OAHsh	*Emericella nidulans*	P50125
EF_LolC	*Epichloë festucae*	EF012267
EF_pOAHsh	*Epichloë festucae*	EF015401
FG_OAHsh	*Fusarium graminearum*	EAA67392
KL_MET17	*Kluyveromyces lactis*	Q92441
NC_pOAHsh	*Neotyphodium coenophialum*	EF015402
NP_pOAHsh	*Neotyphodium* sp. PauTG-1	EF015403
NCr_pOAHsh	*Neurospora crassa*	EAA27038

[a] All accession numbers are from Genbank (accession numbers begin with at least two letters) or UniProt (accession numbers begin with P, Q, or O).

This, at first glance, could appear to be a fungal-fungal horizontal gene transfer event. Thus, the evidence in Kutil (2006) was mixed in that there were some data that might support HGT and some that might support duplication and subsequent neofunctionalization.

Hypothesis

As loline alkaloids are only produced in some *Neotyphodium* and *Epichloë* species, we hypothesize the loline biosynthetic gene cluster, specifically *lolC* and *lolD*, evolved relatively recently within this clade. Tracking the evolution of these genes

should allow us to discern between evolution via horizontal gene transfer (between fungi) vs. gene duplication with subsequent neofunctionalization. Our *a priori* prediction (null hypothesis) is that *lolC* and *lolD* evolved via gene duplication and subsequent neofunctionalization. This is arguably the most parsimonious explanation, requiring the least number of steps or assumptions, for the evolution of these genes. An alternative hypothesis is that *lolC* and *lolD* evolved through a fungal-fungal HGT.

Methods and materials

Evolutionary rate tests

To test rates of evolution directly, we performed three tests of evolutionary rates for these protein families: a likelihood ratio test, a two-cluster test, and a branch length test. A likelihood ratio test is a statistical test of a molecular clock (null hypothesis is that all genes are evolving at a similar rate). The likelihood ratio test was performed using the TREE-PUZZLE software package (Schmidt et al., 2002), and LINTREE (Takezaki et al., 1995) was used to perform, using default settings, the two-cluster and branch length tests. Table 1 shows the labels and accession numbers for genes in filamentous fungi used to test rates of evolution. *Ustilago maydis* and *Kluyveromyces lactis* were used as outgroups in LolC/OAH rate tests. *Candida albicans* and *Saccharomyces cerevisiae* were used as outgroups in LolD/ODC rate tests.

Homolog search in filamentous fungi and phylogeny reconstruction

Recent availability of genome sequences allowed us to search a greater variety of filamentous fungi than was available previously (Kutil, 2006). Blast searches (BLASTP), using protein sequences of LolC and LolD to query filamentous fungi found

in the Broad Fungal Genome Initiative database. The results are listed in Tables 2 and 3. M-COFFEE (Moretti et al., 2007), with default settings, was used to align protein sequences. Gblocks was then used to remove poorly aligned or divergent sequence (Talavera and Castresana, 2007). PhyML 3.0, with default settings, was then used to reconstruct phylogenies (Guindon et al., 2010).

Results

The results of all three evolutionary rate tests are presented in Fig. 4. In every case the tests supported the hypothesis that the *lol* gene branch, for both *lolD* and *lolC*, evolved more rapidly than the fungal primary metabolism paralogs. One interpretation of these results is that they support a model in which the *lol* genes have neofunctionalized from copies of a fungal primary metabolism gene. However, this does not preclude the possibility of a horizontal gene transfer event between fungal species, followed by a subsequent rapid evolution.

The result of the OAH maximum likelihood phylogenetic reconstruction for filamentous fungi (Fig. 5) shows that there are two clades of OAH homologs in filamentous fungi. Clade A (the "OAH group") includes some functionally characterized primary metabolism *oah* genes (Kerr and Flavin, 1968; Murooka et al., 1977; Paszewski and Grabski, 1974), thus presumably this clade harbors the orthologs to *oah*. The other, clade B, is the OAH-like proteins (homologous to *oah* genes), which includes LolC from the endophytes. *Fusarium verticillioides* and *Fusarium oxysporum* have two copies of genes within clade A. In clade B both *F. verticillioides* and *Microsporum canis* have two copies. OAH-like genes are present in the divergent

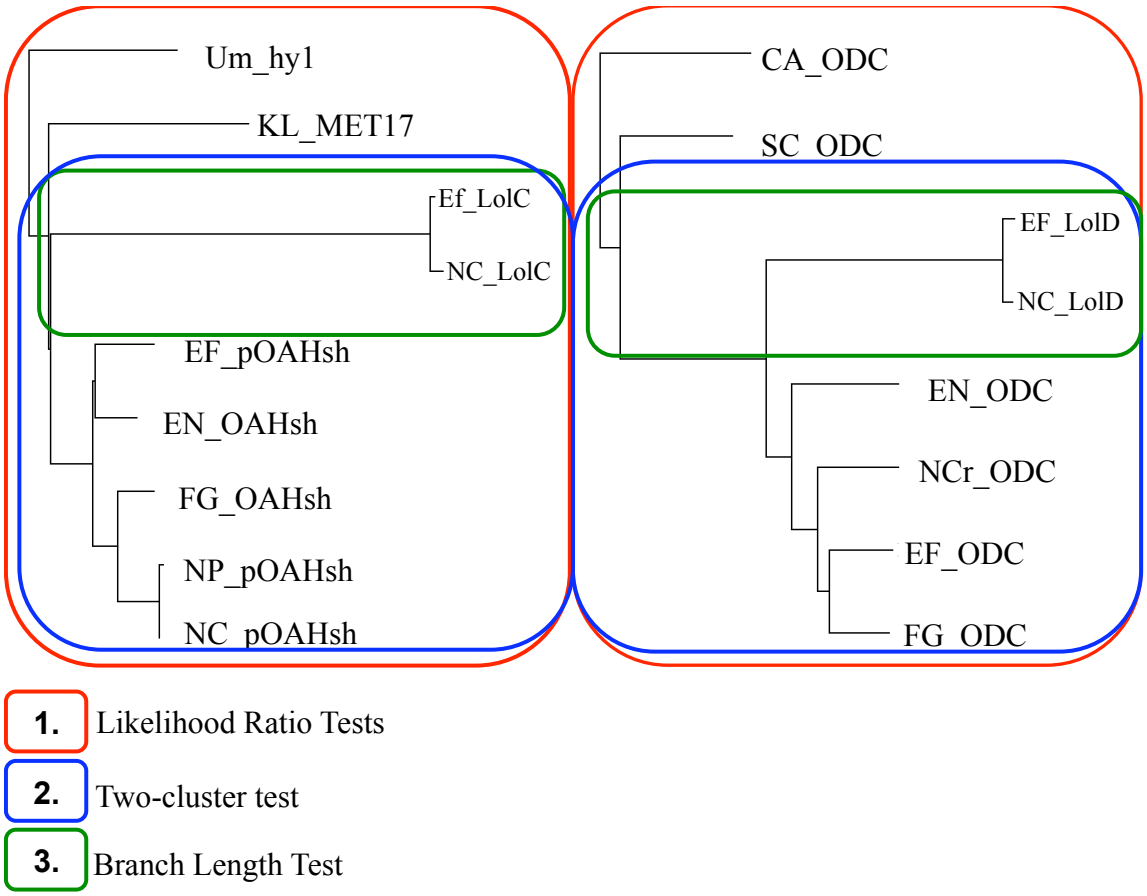

Fig. 4: Evolutionary rate tests diagrams for LolC and LolD. Three tests indicated significant variation in the rate of evolution between the branch associated with the lol genes and the rate of evolution in the rest of the branches. The colored boxes indicate the specific ability of each test to localize the lineages responsible for variation in the rate of evolution. Label Descriptions are found in Table 1.

Table 2: LolC homologs in filamentous fungi. Homologs identified by BLASTP searches against Broad Institute Fungal Genome Initiative Database.

Label	Accession	Description
A. nidulans OAH	ANID_08277.1	O-acetylhomoserine (thiol)-lyase
B. dermatitidis ER-3 OAH	BDCG_05633.1	O-acetylhomoserine (thiol)-lyase
B. cinerea OAH	BC1G_07012.1	MET17
C. immitis RS (finished) OAH	CIMG_06302.3	O-acetylhomoserine
C. globosum OAH	CHGG_10335.1	hypothetical protein
E. festucae LolC	ABQ57512.1	LolC
E. festucae OAH	ABM55738	O-acetylhomoserine sulfhydrylase
F. graminearum OAH	FGSG_01417	O-acetylhomoserine
F. oxysporum OAH-1	FOXG_11296.2	O-acetylhomoserine
F. oxysporum OAH-2	FOXG_15240.2	O-acetylhomoserine
F. verticillioides OAH-1	FVEG_09495.2	O-acetylhomoserine
F. verticillioides OAH-2	FVEG_12529.2	O-acetylhomoserine
F. verticillioides OAH-like-2	FVEG_03153.2	conserved hypothetical protein
F. verticillioides OAH-like-1	FVEG_03158.2	conserved hypothetical protein
H. capsulatum G186AR OAH	HCBG_08798.2	O-acetylhomoserine sulfhydrylase
M. canis CBS 113480 OAH-like-2	MCYG_07619.1	LolC-2
M. canis CBS 113480 OAH	MCYG_01712	conserved hypothetical protein
M. canis CBS 113480 OAH-like-1	MCYG_01744.1	o-acetylhomoserine (thiol)-lyase
M. gypseum CBS 118893 OAH	MGYG_04352	O-acetylhomoserine (thiol)-lyase
M. grisae 70-15 OAH	MGG_07195.6	O-acetylhomoserine (thiol)-lyase
N. crassa OR74A OAH	NCU01652.4	O-acetylhomoserine
N. fischeri OAH-like	NFIA_043890	[unnamed product]
N. fischeri OAH	NFIA_037850	[unnamed product] OAH gene family
N. uncinatum LolC-2	AAV68695.1	LolC-2
N. uncinatum LolC-1	AAV68703.1	LolC-1
P. brasiliensis Pb01 OAH	PAAG_08100.1	O-acetylhomoserine (thiol)-lyase
S. sclerotiorum OAH	SS1G_03734	protein MET17
S. cerevisiae OAH	SCRG_04251.1	MET17
T. rubrum CBS 118892 OAH	TERG_07777	O-acetylhomoserine (thiol)-lyase
T. verrucosum HKI 0517 OAH	TRV_08137	Cys/Met metabolism PLP-dependent enzyme
T. virens OAH	Trire274905*JGI databae	hypothetical protein
U. reesii OAH	UREG_04082.1	O-acetylhomoserine
V. albo-atrum VaMs.102 OAH-like	VDBG_07576.1	O-acetylhomoserine (thiol)-lyase
V. albo-atrum VaMs.102 OAH	VDBG_03027.1	O-acetylhomoserine (thiol)-lyase
V. dahliae VdLs.17 OAH	VDAG_03939.1	O-acetylhomoserine (thiol)-lyase
V. dahliae VdLs.17 OAH-like	VDAG_09297	O-acetylhomoserine (thiol)-lyase

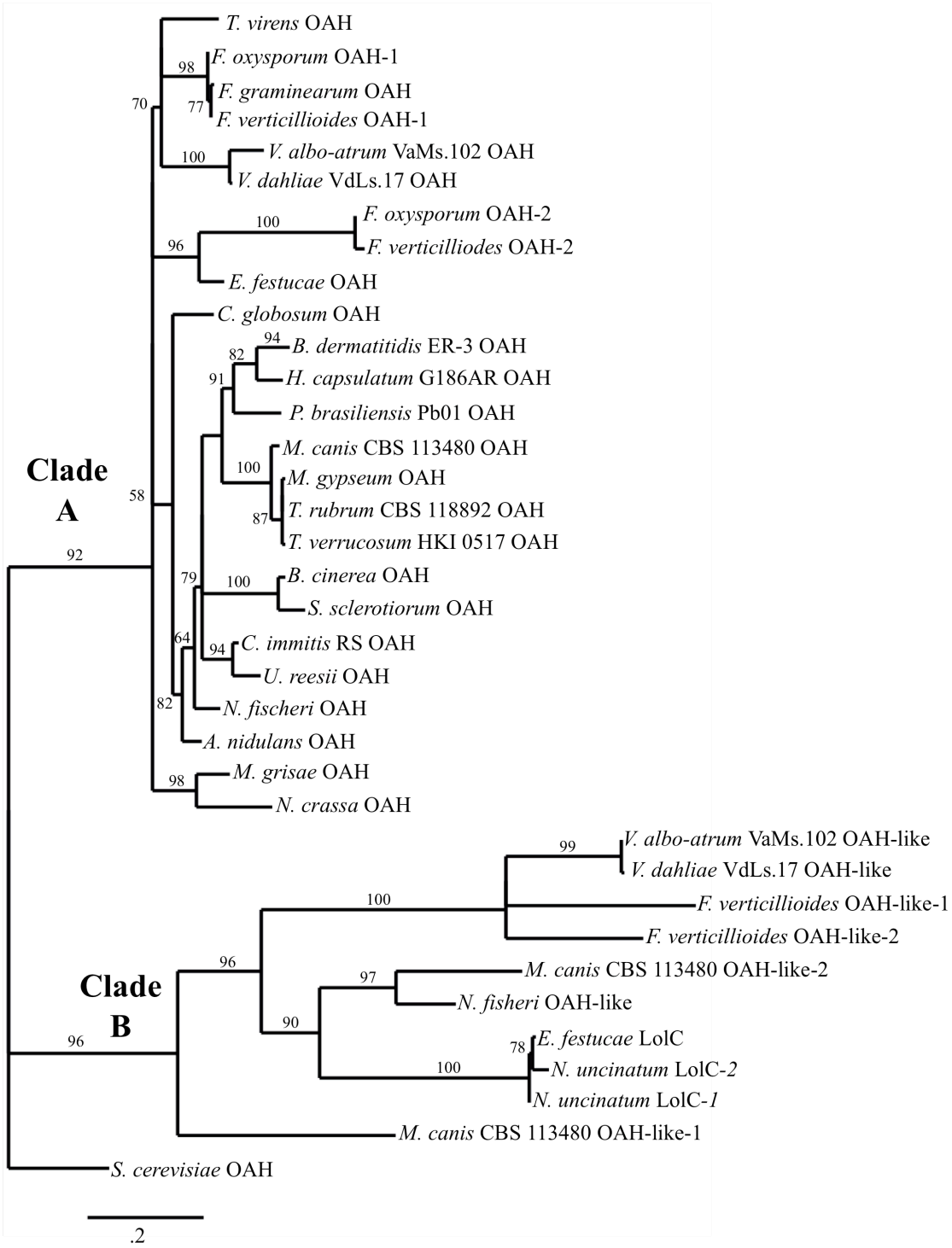

Fig. 5: Maximum likelihood tree of *Epichloë* LolC homologs in filamentous fungi. Support values for each clade are shown. Clades with support values less than 50 are collapsed. Label Descriptions and accession numbers are found in Table 2.

Table 3: LolD homologs in filamentous fungi. Identified by BLASTP against the Broad Fungal Initiative Database.

Label	Accession	Description
A. flavus ODC-like-1	AFL2G_07144.2	Hyp. Protein similar to ODC
A. flavus ODC-like-2	AFL2G_08997.2	Hyp. Protein similar to ODC
A. flavus ODC	AFL2G_04581.2	ornithine decarboxylase
A. nidulans ODC	ANID_03846	ornithine decarboxylase
A. oryzae ODC	AO090023000771	[unnamed product]
A. oryzae ODC-like-1	AO090026000380	[unnamed product]
A. oryzae ODC-like-2	AO090038000189	[unnamed product]
A. oryzae ODC-like-3	AO090026000097	[unnamed product]
B. dermatitidis ER-3 ODC	BDCG_03169.1	ornithine decarboxylase
B. cinerea ODC-1	BC1G_01799.1	ornithine decarboxylase
B. cinerea ODC-2	BC1G_07866.1	ornithine decarboxylase
B. cinerea ODC-like	BC1G_01329.1	ornithine decarboxylase
C. immitis RS ODC-like	CIMG_09566	ornithine decarboxylase
C. immitis RS ODC	CIMG_08778	ornithine decarboxylase
C. globosum ODC	CHGG_02594.1	hypothetical protein
E. festucae LolD	ABQ57511.1	LolD
E. festucae ODC	ABM55741.1	ODC
F. graminearum ODC	FGSG_05903.2	ODC
F. oxysporum ODC	FOXG_07603.2	ornithine decarboxylase
F. verticillioides ODC	FVEG_04532.2	ornithine decarboxylase
H. capsulatum G186AR ODC	HCBG_07023.2	ornithine decarboxylase
M. canis CBS 113480 ODC	MCYG_02623.1	ornithine decarboxylase
M. gypseum CBS 118893 ODC	MGYG_08344	ornithine decarboxylase
M. oryzae 70-15 (MG6) ODC	MGG_02441.6	ornithine decarboxylase
N. crassa OR74A (NC10) ODC	NCU01271.4	spe-1
N. fischeri ODC	NFIA_108190	[unnamed product]
N. fischeri ODC-like-1	NFIA_101680	[unnamed product]
N. fischeri ODC-like-2	NFIA_099170	[unnamed product]
N. uncinatum LolD-2	AAV68696.1	LolD-2
N. uncinatum LolD-1	AAV68704.1	LolD-1
P. brasiliensis Pb01 ODC	PAAG_03153.1	ornithine decarboxylase
S. sclerotiorum ODC	SS1G_12207	ornithine decarboxylase
S. cerevisiae ODC	SCRG_03844.1	SPE1
S. nodorum ODC	SNOG_03643.1	[unnamed product]
T. rubrum CBS 118892 Odc	TERG_05558.2	[unnamed product]
T. verrucosum HKI 0517 ODC-like	TRV_01774	[unnamed product]
T. verrucosum HKI 0517 ODC	TRV_06787	[unnamed product]
T. virens ODC	Trire277119* JGI Databse	[unnamed product]
Uncinocarpus reesii ODC	UREG_02767.1	ornithine decarboxylase
Uncinocarpus reesii ODC-like	UREG_04756.1	predicted protein
V. dahliae VdLs.17 ODC	VDAG_01272.1	ornithine decarboxylase

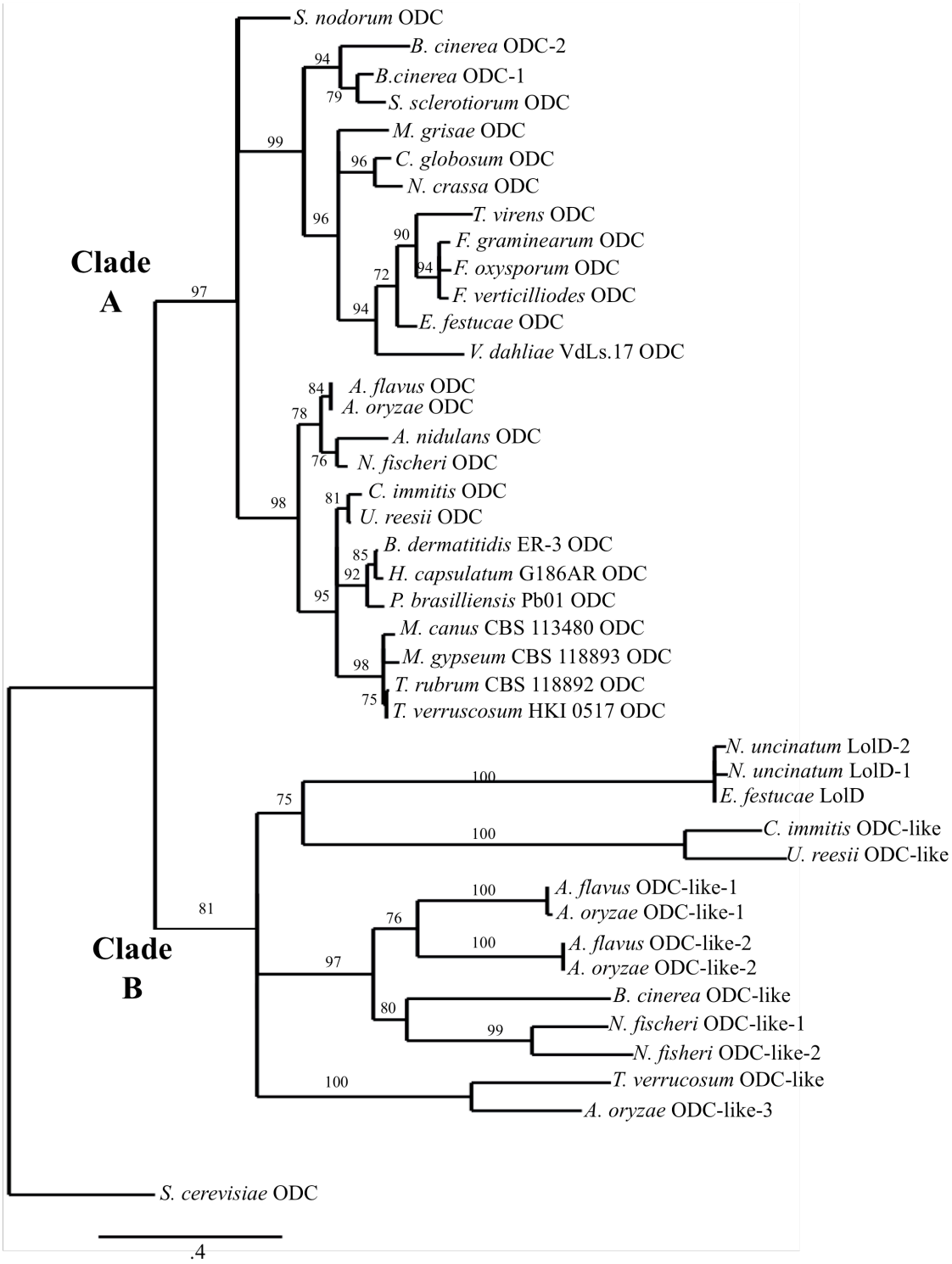

Fig. 6: Maximum likelihood tree of *Epichloë* LolD homologs in filamentous fungi. Support values for each clade are shown. Clades with support values less than 50 are collapsed. Label descriptions and accession numbers are found in Table 3.

genera *Fusarium* and *Neosartorya*. This maximum likelihood tree indicates that the presence of genes paralogous to *oah* is not restricted to *Neotyphodium* and *Epichlöe* spp., rather many fungal lineages have the OAH-like genes. The simplest explanation for this pattern is that the paralogs originated via duplication in a common ancestor to the filamentous fungi.

The ODC gene family tree (Fig. 6) displays similar patterns to the OAH gene family tree. There are two clades of genes. Clade A consists of genes that group with the known primary metabolism ODC (likely orthologs to ODC). Clade B includes ODC-like (genes paralogous to *odc*) genes as well as LolD from the fungal endophytes. In this tree, *Botrytis cinerea* contains two genes in clade A. *N. fischeri*, *Aspergillus flavus*, and *Aspergillus oryzae* all have more than one copy of the ODC-like genes in clade B. Again a wide taxanomic range of species possess genes that reside in clade B, in this case the *Aspergillus* and *Botrytis* genera. Similar to the OAH gene family tree, the ODC-like proteins originated in the common ancestor of the filamentous fungi.

N. fischeri was the only non endophyte species sampled that contained both co-paralogs of the primary metabolism genes (i.e. both an ODC-like and an OAH-like gene). A query of the *N. fisheri* genomes revealed that these genes are not clustered together, as they are in *Epichloë* and *Neotyphodium* genera.

Discussion

A more thorough analysis of the ODC and OAH gene families in filamentous fungi has provided us with a clearer understanding of *lolC* and *lolD* evolution, as well as the origin of the loline biosynthetic cluster. Contrary to our earlier hypothesis of *lolD*

and *lolC* originating in the fungal endophyte lineages, it appears that *lolD* and *lolC* diverged from *odc* and *oah* early in the evolutionary history of the filamentous fungi. While they originally appeared to be "orphans", our more recent analyses show them to be part of a larger class of co-paralogs of the primary metabolism genes. The most likely scenario is that they arose by independent duplication events in the *odc* and *oah* genes in an early ancestor of the filamentous fungi. Subsequently, one copy maintained the original function and the other neofunctionalized and was then "recruited" into the loline biosynthetic pathway in the ancestor of the endophytes. These paralogous genes appear in some species of a genus and not in others. In the species that maintained the paralogs of *odc* and *oah* it stands to reason there must be some evolutionary advantage to maintain it. This is certainly the case for loline alkaloid biosynthesis in the endophyte lineages (Wilkinson et al., 2000). Loline alkaloids have not been detected outside the endophyte lineage, so presumably the other co-paralogs in the same clades with the *LOL* genes have been recruited into different functions in the genomes that harbor them. It is also important to note, that while these genes occur in the same clades in the phylogenies (Fig. 5 and Fig. 6), the longer branch lengths, even when there are duplicate copies in the same species, suggest that they experienced rapid evolution and now perform different functions. It appears that duplication events occurred more than once in these genes families. Also, we found instances of a relatively recent duplication of the primary *odc* and *oah* metabolism genes, both in *B. cinerea* and *Fusarium* genera respectively.

Summary

The data generated in this study indicate that the *lolC* and *lolD* genes of the fungal endophytes originated as independent ancient gene duplications in an ancestor of the filamentous fungi. We favor the interpretation that both genes neofunctionalized and were recruited into the loline biosynthetic cluster in the endophyte ancestor. The more likely scenario of the evolutionary history of these genes includes the loss of this duplicate copy in most species, as opposed to multiple horizontal gene transfers into species that have co-paralogs to the lol genes (i.e. ODC-like and OAH-like genes). A commonly held assumption of trait evolution is that losses ought to be scored as more likely than gains. We find this duplication event has occurred in a large proportion of the fungal lineages queried. This is more likely explained by maintenance in only some lineages and gene loss in others than by HGT. Further, we see no evidence of a "selfish cluster" of genes present in any of the other lineages. This leads us to conclude that the loline biosynthetic cluster was assembled, in the fungal endophytes, by duplicated and neofunctionalized copies of genes.

CHAPTER III

EVOLUTION OF THE MITOGEN-ACTIVATED PROTEIN KINASE GENE FAMILY

Introduction

Mitogen activated protein (MAP) kinase signaling cascades are features unique to and ubiquitous in eukaryotes (Pearson et al., 2001). This type of signal transduction network was first identified in mammalian species (Sturgill and Ray, 1986), and soon after, in budding yeasts (Courchesne et al., 1989). "Mitogen" refers to a chemical substance or a protein that induces mitosis. MAP kinase signal cascades can trigger mitosis but they might also trigger gene expression, cell differentiation, mitosis or cell death. These pathways are populated by a class of serine/threonine protein kinases that act in a cascade to transmit a molecular "signal" from the surface of the cell membrane to the nucleus, which elicits a phenotypic response. Each cascade consists of three enzymes which all have a kinase domain: [MAP kinase kinase kinase (MAPKKK), MAP kinase kinase (MAPKK), and MAP kinase (MAPK)]. These components act sequentially, as shown in Fig. 7, to transduce and amplify an environmental signal from a receptor protein to downstream genes that are directly involved in phenotypic responses (Treisman, 1996). The MAP kinase pathways in *Saccharomyces cerevisiae* are among the earliest identified and most well characterized. *S. cerevisiae* contains five cascades (gene networks) with six different MAP kinases (Fig. 8). In Fig. 8 the core elements (MAPKKK, MAPKK, MAPK) are shown in the context of identified upstream

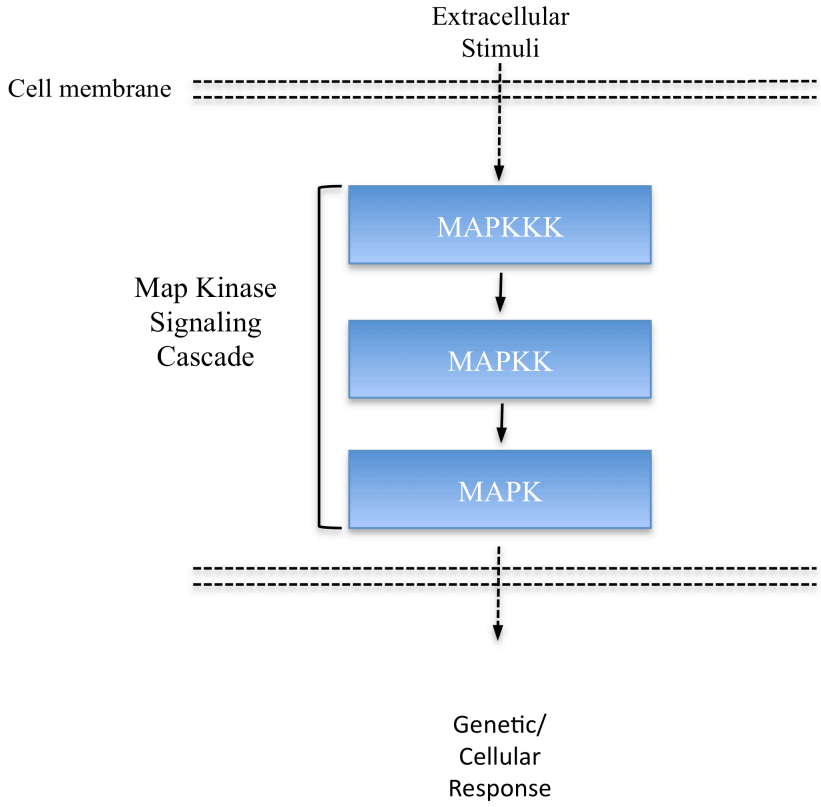

Fig. 7: Depiction of a generic MAP kinase signaling cascade. An extracellular signal is transduced into the cell, amplified through the MAP Kinase signaling cascade, to elicit a phenotypic response.

and downstream elements. Arguably, the MAPKKK, MAPKK, and MAPK components make excellent candidates for studies of gene and gene network evolution because they have well defined essential functions and they are conserved across a broad phylogenetic scale (Widmann et al., 1999). In this study, we use comparative genomics approaches and phylogenetic analysis to characterize the evolution of these gene network components in the filamentous fungi.

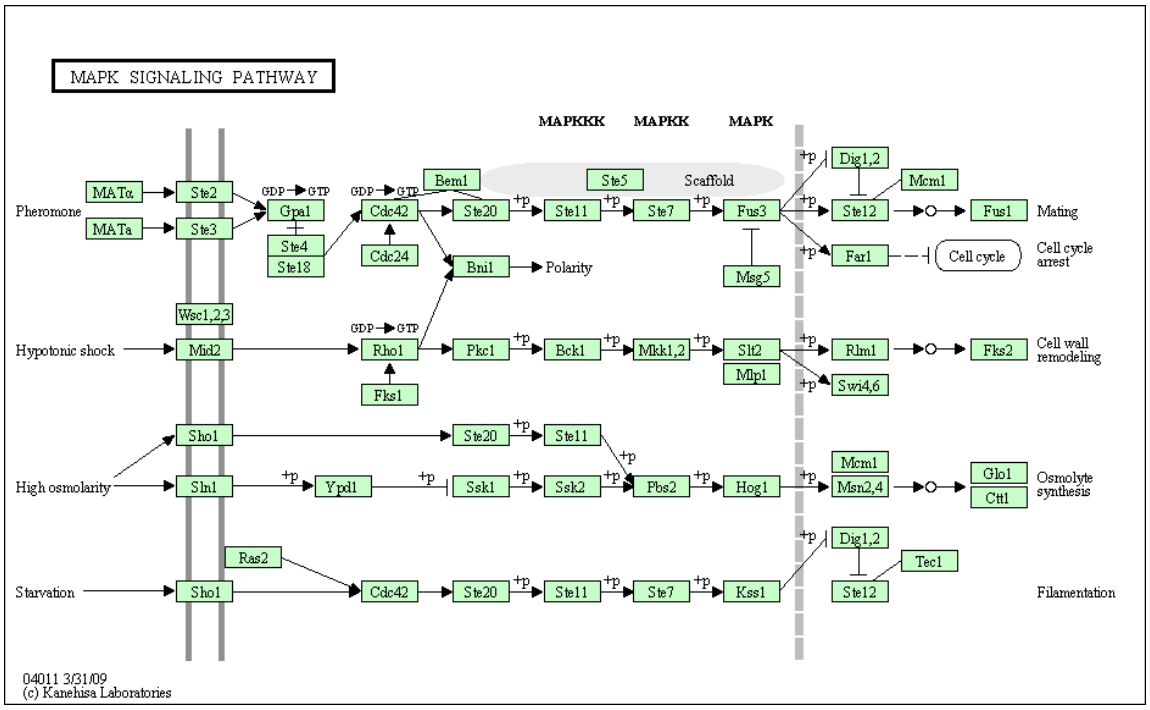

Fig. 8: MAPK signaling pathways in *Saccharomyces cerevisiae*. Reproduced with permission from Kanehisa et al., 2002.

Filamentous fungi contain three paralogous mitogen-activated protein (MAP) kinase-signaling cascades within their genomes. Each cascade contains 3 "hub" proteins (MAPKKK, MAPKK, MAPK). Analysis of mutations in fungal cascade components frequently reveals dramatic phenotypic consequences including effects on pathogenicity, mating, asexual development, and abiotic stress response (Banuett, 1998). In humans, genes in these pathways are involved in many physiological activities including cell differentiation, apoptosis, and tumor suppression (Pearson et al., 2001).

The genes of interest in this study are "hub" genes that tend to be functionally conserved throughout all lineages. Commonly asserted features of hub proteins include their low probability of being "lost" in evolutionary history, their tendency to

accumulate fewer substitutions, their ability to interact with many partners (i.e. they tend to be in a central portion of a gene network), and that they are more likely to be essential to the organism (i.e. lethal if deleted) (He and Zhang, 2006; Krylov et al., 2003). He and Zhang (2006) show, using *S. cerevisiae* as a model, that hub proteins are hubs primarily because of their centrality to the gene network. He and Zhang (2006) define "centrality" as the number of protein-protein interactions. This centrality increases the chances of lethal consequences if changes in the protein occur, which provides strong purifying selection.

We reasoned that different hub proteins encoded by genes in a network would interact with different consortia of partner proteins. For example, there might be variation in the numbers of partners for each hub protein. Furthermore, the partner proteins might have a variety of histories (e.g. other hub proteins or lineage specific proteins). Since these partner proteins would likely impose selection on each hub protein, different hub proteins within a network might exhibit different degrees of conservation based on their role in the network. Further, we reasoned that the hubs with the highest level of conservation of upstream and downstream components, would exhibit the least sequence divergence across a diverse range of taxa, presumably due to purifying selection. To evaluate this hypothesis, we chose the MAP kinase-signaling cascade as a model to test assumptions of hub genes.

The MAPKK component of the MAP kinase-signaling cascade interacts with two other kinase proteins in all eukaryotes (i.e. MAPK and MAPKKK). We predicted that since it shares upstream and downstream partners throughout all evolutionary history, it

would be the most conserved due to this consistent selection pressure. In contrast, although the MAPKKK and MAPK both interact with the MAPKK, each is also likely to interact with proteins that are encoded by lineage specific genes in the gene network. Thus, we reasoned that these genes ought to exhibit less conservation than the MAPKK. Furthermore, we reasoned that the variation in the degree of conservation might serve as an indicator for which of the genes encode the hub proteins with greatest diversity of partners. For example, one might expect that since the MAPKKK is interfacing with the end of the network that receives the environmental signal, then due to natural selection for niche specificity it might have a more diverse set of partners than the other two hubs. Therefore, one might expect greater sequence divergence in the MAPKKK than in the other two proteins.

The simplest hypothesis for the evolution of three MAP Kinase signal cascades in filamentous fungi and those yeasts with no history of whole genome duplication (WGD) (e.g. *Kluyveromyces waltii* but not *S. cerevisiae*) (Kellis et al., 2004) is that the last common ancestor to the fungi had 3 cascades. Furthermore, since the cascades are involved in functions essential to survival, maintenance of a full complement of the 3 cascades (9 genes) was maintained in all species. So long as the genes were maintained each pathway would be free to evolve independently along with species divergence. Fungi have the simplest arrangement of MAP kinase cascades, other eukaryotes (plants and animals) seem to have had expansions and losses of different component genes probably corresponding to selection for a greater degree of tissue specificity (Manning et al., 2002). Since the fungi share three full cascades it seems reasonable to expect we can

trace the evolution of the traits influenced by each (e.g. mating, abiotic stress and cell wall development).

The combination of fungal genome sequence data for species spanning the filamentous fungi and maximum parsimony phylogenetic analysis tools allow direct tests of these hypotheses. We chose maximum parsimony to infer phylogenies of the MAP kinase components because it is a robust method for inferring phylogenies, especially when rates of evolution are homogeneous (Kuhner and Felsenstein, 1994). Furthermore, we can use the sensitivity of maximum parsimony to heterologous rates of evolution to directly test for varying rates (i.e. rate homogeneity tests). The specific strategy for this analysis was to 1) evaluate the degree of maintenance of the known partner consortia across a large phylogenetic scale (fungi to animals), 2) evaluate the degree of sequence divergence within each class of genes, and 3) trace the evolutionary history of each gene and each pathway.

Methods and materials

Survey of conservation for partner proteins in fungi and animals

We used the well-characterized MAP kinase cascades and known partner proteins of yeast (Fig. 8) to query a representative set of fungal and animal genomes. The goal was to determine whether each component protein was conserved or if novel lineage–specific components were common. Furthermore, we sought to determine whether there were differences in the distribution of lineage specific partners among the different MAPKKK, MAPKK and MAPK hub proteins. For the filamentous fungi, we chose *Aspergillus nidulans* and *Neurospora crassa* because these two model organisms

come from two separate classes and represent a deep level of divergence within the filamentous fungi. We also chose a fungus more closely related to *N. crassa, Fusarium graminearum*, which is a plant pathogen. For the metazoans, we chose *Homo sapiens*, *Mus musculus*, and *Caenorhabditis elegans* because they are well characterized model systems and represent large evolutionary distances within the animals. To determine the conservation of the MAP kinase-signaling cascades in eukaryotes, we identified the best bi-directional blast hits (BLASTP) to the corresponding genes in *S. cerevisiae*. The detailed list of genes queried from *S. cerevisiae* are found in Appendix D, Table D1.

MAP Kinase cascade component orthology search and gene family analyses in Pezizomycotina

Our selection criteria for fungal species in the gene family analyses was 1) availability of a fungal genome sequence, 2) representation of different classes within the subdivision Pezizomycotina (Figs. 2 and 3) outgroups representative of the Basidiomycota and Saccharomycotina. We identified MAP kinase proteins (MAPKKK, MAPKK, MAPK) homologous to *S. cerevisiae* in eight filamentous fungi (*A. nidulans*, *Botrytis cinerea*, *Chaetomium globosum*, *F. graminearum*, *Magnaporthe grisea*, *N. crassa*, *Aspergillus fumigatus*, and *Sclerotinia sclerotiorum*), using best bi-directional BLAST (BLASTP) hits. We also identified the components of two basidiomycetes, *Cryptococcus neoformans* and *Ustilago maydis*, a human pathogen and a plant pathogen respectively. We then generated multiple sequence alignments for each of the components (MAPK, MAPKK, and MAPKKK) using CLUSTAL_X (Thompson et al., 1994) with default settings. Phylogenetic trees were created using the maximum

parsimony algorithm implemented in PAUP 4.0b10 (Swofford, 2002) using a heuristic search, with default settings. The detailed list of genes queried in the filamentous fungi is found in Appendix D, Table D2.

Partition homogeneity tests were performed in PAUP to identify differing rates of evolution among paralogs of each component within species, and orthologs across species. A partition homogeneity test can help identify protein sequences undergoing differing rates of evolution, as well as determine if different phylogenies are congruent. The null hypothesis of this test is that tree topologies do not differ. A p-value < 0.05 would suggest different rates of evolution. Sequences that do not differ significantly in tree topology were combined to generate multi-gene trees.

Results

Conservation of MAP kinase components between fungal and animal lineages

The results for the survey of MAP kinase cascade and partner protein components are summarized in Fig. 9. The orthologs, identified in the filamentous fungi and animals, correspond to the components found in the sexual development/cell cycle control, response to high osmolarity, and cell wall remodeling (in response to hypotonic shock) pathways in *S. cerevisiae.* We refer to the names of the pathways by their functions in *S. cerevisiae*. We observed that while the MAP kinase cascade proteins (MAPKKK, MAPKK, MAPK) themselves are conserved within the genomes of filamentous fungi and animals, the downstream components (e.g. known transcription factors) are seldom conserved. The downstream components from the fungal pathways were not detected in any metazoan. Furthermore, within the euascomycetes, out of the

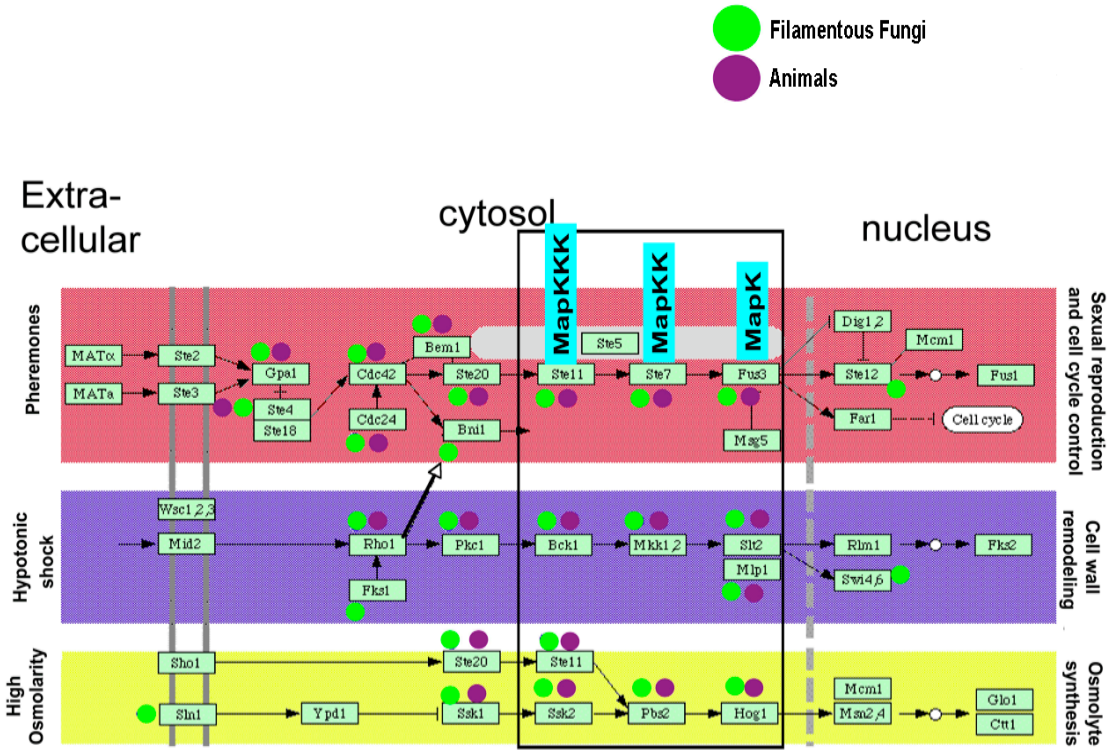

Fig. 9: KEGG pathway diagram of MAP kinase signaling pathway in *Saccharomyces cerevisiae.* Each pathway is color coded. Best bidirectional Blast hits were performed and dots correspond to components conserved in filamentous fungi (green) and animals (purple). Genes used in subsequent phylogenetic studies are indicated by the surrounding box. Adapted with permission from Kanehisa et al., 2002.

19 genes used to query the fungal genomes only SWI6 and STE12 are conserved. In contrast, the upstream components tended to be conserved in fungi and animals. Not surprisingly, the euascomycetes had a greater degree of conservation to *S. cerevisiae* in the upstream components than did the animals (Fig. 9).

Inferring phylogenies of MAP kinase cascade proteins in filamentous fungi

We observed that all filamentous fungi contained at least three different paralogous MAP kinase signaling cascade pathways (Appendix D). Genomes of fungi in the genus *Aspergillus* had an additional MAPK, a co-ortholog of *fus3* (data not shown),

however for the sake of phyogenetic comparisons across fungal species we used only the best bidirectional blast hit MAPK as the ortholog for *fus3*. For each of the cascade components (MAPKKK, MAPKK, MAPK), we inferred phylogenies, using maximum parsimony (Fig. 10). The orthologous genes, for each functional pathway, cluster with each other (as indicated by the color-coding in Fig. 10). However, in the MAPKK tree, the clade of genes orthologous to sexual development genes in yeast clusters with the clade of genes orthologous to yeast cell wall remodeling, as opposed to the MAPKKK and the MAPK tree which show sexual development orthologs clustering with osmolyte synthesis orthologs. Furthermore, within each clade of genes, the topologies are not identical.

Partition homogeneity tests and multi-gene tree

We performed partition homogeneity tests to determine if the non-identical tree topologies were statistically significant. We performed this test between each component of individual pathways, and between the trees for MAPKKK, MAPKK, and MAPK (Table 4). The results of the partition homogeneity test indicate that the null hypothesis of no difference in tree topologies is correct (Table 4). As a result we can combine the sequences of each paralogous protein and every component of the signaling cascade to increase the power of the parsimony analysis, such that a concatenated alignment of the 9 genes for each species is used to generate a muti-gene phylogeny (Fig. 11) as well as combining the genes in each pathway (3) for each species together to infer the phylogeny for each pathway (Fig. 12). In this way, we inferred a rigorous evolutionary history of these genes, and each pathway, and not surprisingly when compared to a

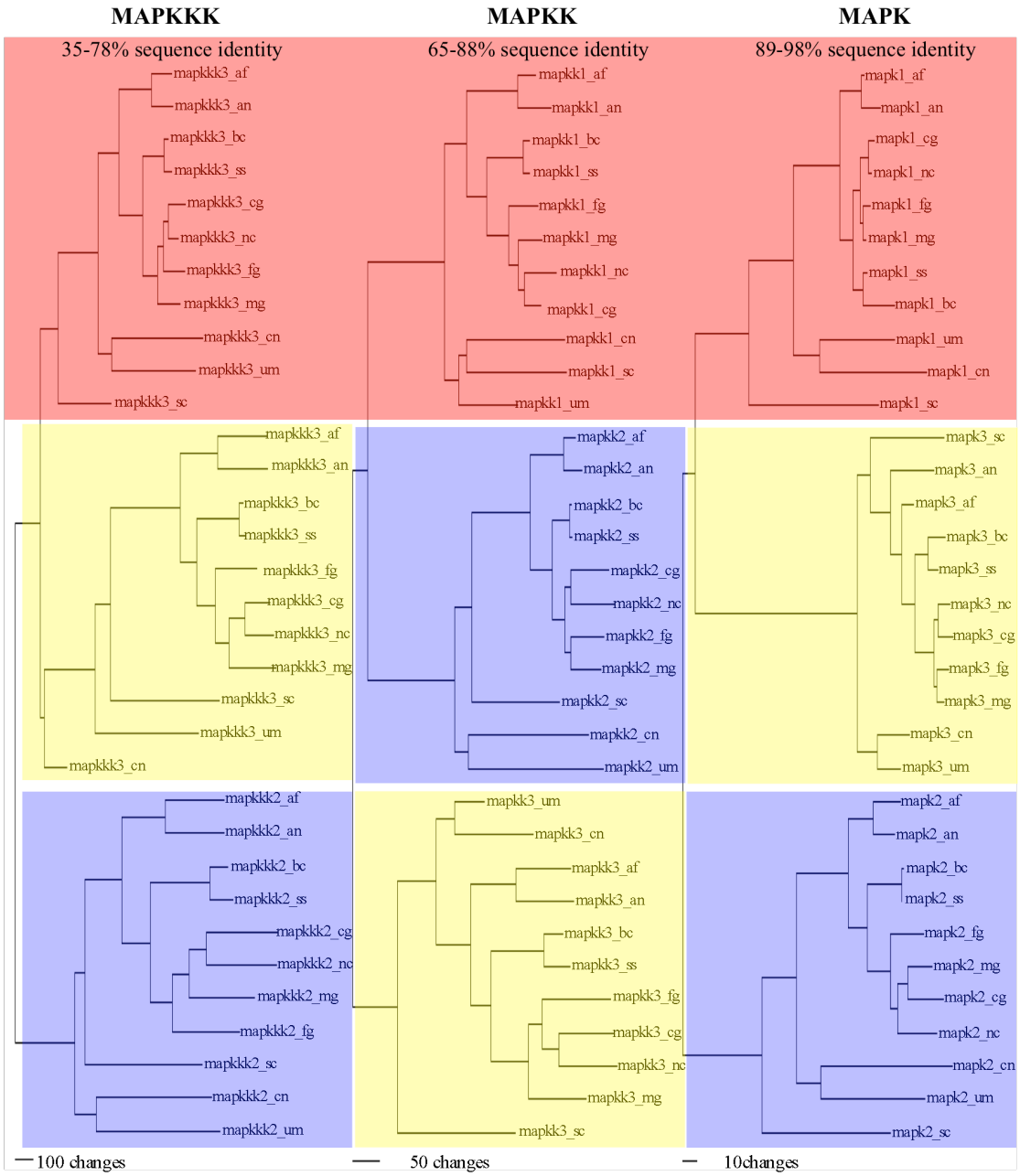

Fig. 10: Maximum parsimony tree of MAP kinase components. Species abbreviations are an: *Aspergillus nidulans* bc: *Botrytis cinerea* cg: *Chaetomium globosum* fg: *Fusarium graminearum* mg: *Magnaporthe grisea* nc: *Neurospora crassa* af: *Aspergillus fumigatus* ss: *Sclerotinia sclerotiorum* sc: *Saccharomyces cerevisiae* cn: *Cryptococcus neoformans* um: *Ustilago maydis*. Panel colors indicate orthologs to signaling pathways in *S. cerevisiae*. Pathway categories are: red: pheromone pathway; blue: cell wall remodeling pathway; yellow: osmolyte synthesis pathway. Sequence identity values refer to the range within each clade of MAP-type components. Labels and accession numbers are found in Appendix D, Table D2.

Table 4: Partition homogeneity tests. p values to the right are the results of the homogeneity tests between the topologies of the clades of components. The p-value at the bottom is the result of the homogeneity test between component phylogenies. The null hypothesis of no difference in tree topologies cannot be rejected

Sexual Development	MAPKKK	MAPKK	MAPK	P value = .59
Cell Wall Remodeling	MAPKKK	MAPKK	MAPK	P value = .32
Osmolyte Synthesis	MAPKKK	MAPKK	MAPK	P value = .25
P value = .11				

species phylogeny generated from the 18s rDNA the multigene phylogeny tracks the evolution of the species. This is certainly consistent with conservation of the components from one ancient arrangement (3 cascades) pre-fungal lineage ancestor.

Discussion

While the MAP kinase signaling cascade and many upstream components were conserved throughout a large evolutionary distance, downstream partners were not. Maintenance of the cascade components in all species surveyed supports the hypothesis that these proteins are "hubs" in this gene network. Counter to our *a priori* hypothesis that the MAPKK would be the most conserved hub protein in this network, the MAPK exhibited the least sequence divergence, as indicated by the branch lengths and sequence identity shown in Fig. 10. According to He and Zhang (2006) this suggests that the conservation is selected for by interacting with the greatest number of partner proteins.

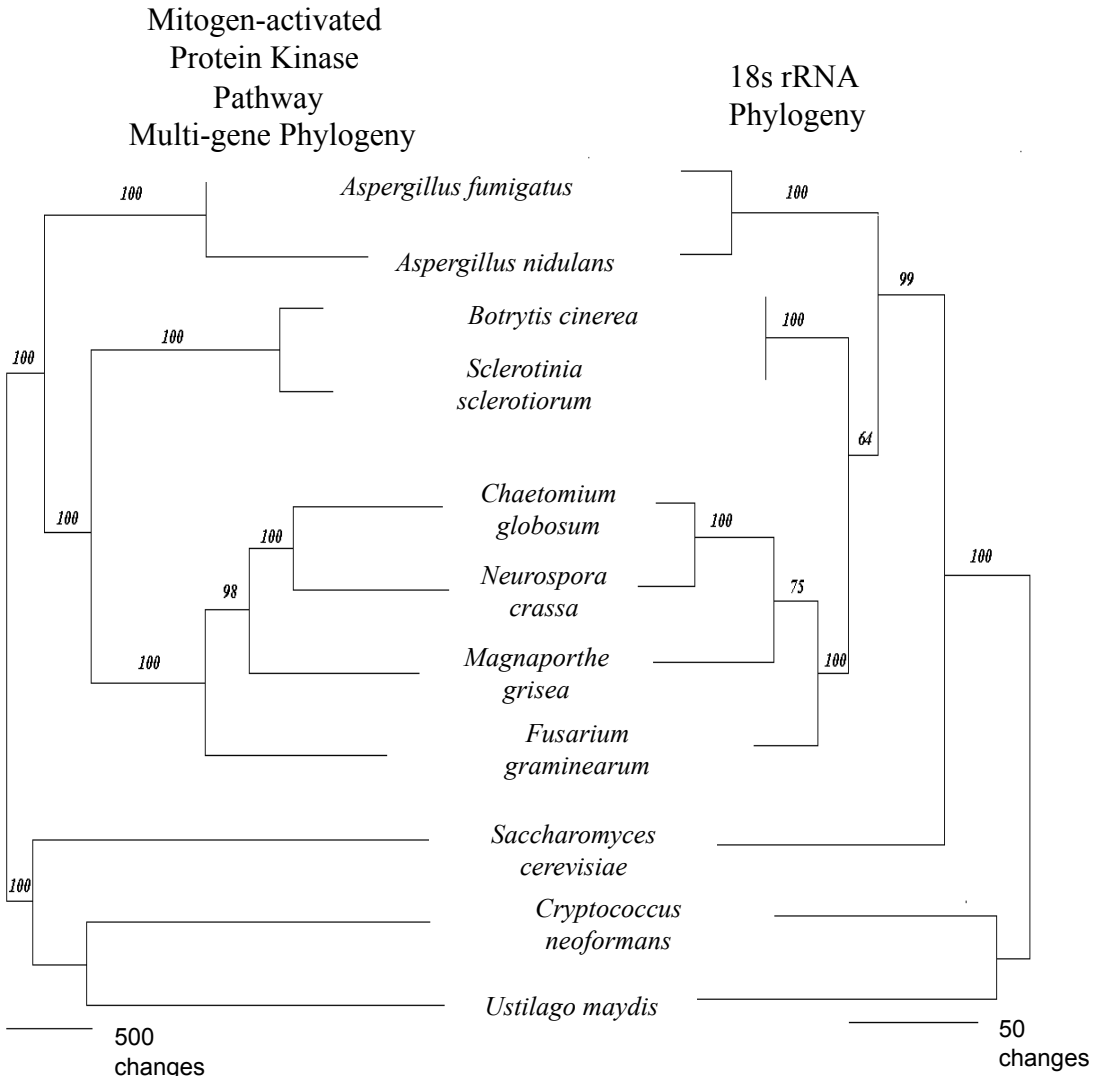

Fig. 11: Maximum parsimony muti-gene phylogeny (99 genes) of MAP kinase components for each species alongside species 18s rRNA tree. Bootstrap values are indicated for each branch.

Based on some analysis in yeast networks (O'Rourke and Herskowitz, 1998; Roberts et al., 2000), this is not an unreasonable assumption (see Fus3 in Fig. 8). We observed that the downstream targets of the MAPK are not conserved throughout evolutionary history so if there are many partners, they are lineage specific (Fig. 9). Further, assuming there are many partners, this suggests that what drives purifying selection in hub proteins is

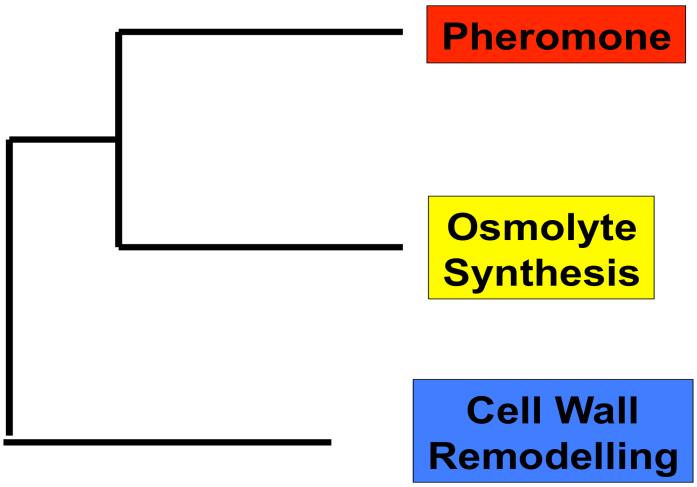

Fig. 12: Diagram of MAP kinase pathway evolution. Inferred using maximum parsimony multi-gene (3 genes per species in each pathway). Species clades were collapsed to generated diagram. Colors indicate orthologs to signaling pathways in *S. cerevisiae*.

not conservation of partner proteins, but in the number of protein-protein interactions the hub protein makes.

The results of the partition homogeneity tests show that the patterns of evolution in all of the cascade components were congruent across the species queried. This allowed us to concatenate the sequence data together to generate a multi-gene phylogeny based on the 99 genes found in the pathways (3 MAPK + 3MAPKK +3 MAPKKK) x 11 species). The resulting tree, shown in Fig. 11, was congruent with the species phylogeny based on 18s rRNA sequence (Berbee, 2001).

Furthermore, because of the congruency of each phylogeny in each pathway, we were able to generate a multi-gene pathway tree (not shown). Fig. 12 is a diagram of the inferred relationships in this tree with species relationships taken out, and pathway histories shown. This tree indicates the first duplication of the putative original single

cascade resulted in two lineages, one ultimately became the cell wall remodeling pathway and the other underwent a subsequent duplication and functional divergence to yield the pheromone and osmotic response pathways. It is tempting to find meaning in the order of these events in eukaryotic evolution, for example; perhaps different pathways might be associated with colonization of land. However, given the presence of orthologs for these pathways in all eukaryotic lineages the divergence of the plants, animals and fungi would predate land colonization. Most likely two duplications of the entire cascade led to the formation of three distinct pathways, with each pathway taking on a sub-functionalized role of the parent pathway, or possibly neofunctionalization. Furthermore, animals, including humans, contain three distinct pathways as well, although in a much expanded form (Johnson and Lapadat, 2002). For example, in humans, there are 9 Ste11 copies. However, MAP3K8 has a low level of expression (only 14 EST sequences have been detected) in testis, lung, and brain libraries. Also, plants have similar patterns of MAP kinase families (Mishra et al., 2006), however; due to the complexity in analyzing polyploid plant genomes, we chose to focus on animals and fungi. Given the evidence for at least three ancestral cascades in all three eukaryotic lineages, it's reasonable to conclude that the expansion of the MAP kinase-signaling cascade predates the divergence of plants, animals, and fungi.

In summary, the MAP kinase cascade components are a suitable gene network to test gene network hypotheses. We find orthologs of the yeast pathway components in fungi and animals. In animals, though, these pathways have been expanded by duplication and have even more complex control mechanisms. Evidence of these three

pathways exists in plants, animals, and fungi, indicating these three pathways were present in the ancestor of all modern eukaryotes. In humans, many of these expanded pathways appear to be expressed only in certain tissues (Manning et al., 2002). It may be the ability of these pathways to be adapted to play novel roles that allows a greater degree of complexity of an organism to evolve. Our original hypothesis that the MAPKK, being in the center of the cascade, would be the most conserved is not supported by this analysis. On the contrary, in filamentous fungi the MAP kinase has the highest sequence identity (89-90% within each clade of the MAPKs). This degree of conservation is very interesting, considering that the majority of direct downstream genes are not present in the filamentous fungi. This also suggests that the MAP kinase has the largest number of protein-protein interactions, since the MAP kinase is highly conserved. It should be possible to detect the specific residues along the protein sequence that would interact with different downstream targets. The MAPKKK has conserved partners and yet it is the least conserved of the proteins in the 3 component-signaling cascade. Again, this favors the MAPK being the central hub of this gene network.

CHAPTER IV

TRANSCRIPTOME ANALYSIS OF *Neurospora crassa* DURING ASEXUAL DEVELOPMENT

Introduction

In *Neurospora crassa* there are two forms of asexual sporulation: macroconidiation, which produces multi-nucleate conidia that are 5 to 10 microns in diameter and microconidiation, which produces mono-nucleate conidia that are 1 micron in diameter (Springer, 1993). In this study we profiled the transcription of *N. crassa* during macroconidiation (hereafter conidiation). The sequence of events during asexual development is well documented (Springer and Yanofsky, 1989). Briefy, macroconidiophores grow by apical budding from aerial hyphae. In initial budding growth, the septum, which forms the junction between cells, has a diameter that is nearly as wide as the cell and produces a chain of barrel-shaped cells which are termed minor constriction chains. As the chain continues to grow at the tip, the septum between newly budded cells is of smaller diameter and the constriction between cells are pronounced, producing chains of cells that resemble beads on a string that are called major constriction chains. Approximately 12 hours post induction, growth ceases and nuclei migrate into the chains. Subsequently cross walls are laid down at each conidial junction, they undergo thickening, and starting at 14 hours the cross walls are cleaved so that conidia (barrel to spherical in shape) can separate as individual spores (Springer and Yanofsky, 1989). Previous investigations to identify differentially expressed genes

include both subtractive hybridization (Berlin and Yanofsky, 1985a) and microarrays (Kasuga and Glass, 2008; Rerngsamran et al., 2005). Specifically, Berlin and Yanofsky, (1985) identified several conidiation-specific genes, termed "con" genes. Rergnsamran and colleagues (2005) investigated the conidiation mutant, *fluffy*, using a cDNA microarray with partial coverage of the genome. Kasuga and Glass (2008) tracked gene expression across defined age sections dissected from a developing colony using the same full genome microarray used in this study. No matter what the approach, the *con* genes remain among the most highly expressed genes in all analyses, including the present study.

The current view of signaling and morphogenesis of conidiation in response to induction of development by exposure of the mycelium to air is that a hyper oxidant state, mediated in part by NADPH oxidase, leads to activation of cAMP and MAP kinase pathways (at least) that trigger formation of aerial hyphae, which grow perpendicular to the substrate mycelium (Aguirre et al., 2006; Aguirre et al., 1989). Aerial hyphae are thought to be physiologically different from vegetative mycelium and aerial hyphae specific genes have been identified that are not expressed in the substrate mycelium or in conidiophores (Li et al., 2005). The formation of aerial hyphae is promoted by cAMP signaling, since adenylate cyclase (*cr-1*, crisp) and protein kinase A (*pkac-1*), mutants are induced for conidiophore development but lack non-conidiogenous aerial hyphae. G-alpha subunits (*gna-3* and to a lesser extent *gna-1*, guanine nucleotide-a) have a similar phenotype and are known to regulate *cr-1* activity (Banno et al., 2005; Kays and Borkovich, 2004; Rosenberg and Pall, 1979). Likewise, homologs of

Saccharomyces cerevisiae ras1 (*smco-7*, semi-colonial) and *ras2* (*bd*, band) affect vegetative growth rate and conidial development and have been implicated as regulators of conidiation, possibly through effects on cAMP signaling (Garnjobst and Tatum, 1967; Sargent and Woodward, 1969). *mak-2* (mitogen-activated protein kinase), is orthologous to *fus3* and *kss1*, and displays a colony and conidiation phenotype similar to cAMP pathway mutants (Li et al., 2005).

Tissue-specific gene expression has been demonstrated for several genes expressed during conidiation (Berlin and Yanofsky, 1985a). However, a global analysis of tissue-specific (aerial hyphae and conidiophores vs. substrate mycelium) has been lacking. The role of the substrate mycelium during conidial morphogenesis is poorly understood. Is it metabolically inactive and simply digested to provide substrates for aerial development? Does it contribute metabolic products to the aerial hyphae through an active reprogramming of metabolism? To gain insight into how signal transduction pathways and metabolic changes contribute to conidiation we performed transcriptional profiling of gene expression during conidiation over time and in different tissues.

In this study we used 70-mer oligonucleotide microarrays to examine *N. crassa* gene expression during synchronous development of conidia across nine time points. A unique aspect of this study was the separate profiling of the actively conidiating aerial hyphae portion of the cultures from the mycelial mat. Thus, we examined tissue specificity as well as temporal control of gene expression during development. In addition to tissue-specificity, gene expression differences were most striking at the time in development when major constriction chains were beginning to mature.

Methods and materials

Time course

N. crassa cultures at discrete stages during the development of conidia were prepared based on the method described by (Berlin and Yanofsky, 1985b). Briefly, an 8-liter carboy containing four liters of Vogel's medium (2% sucrose) was inoculated with conidia to make a suspension with a final concentration of 10^6 conidia/mL. Sterile air was then vigorously bubbled through the suspension, to ensure aeration and agitation, for 20 hours at room temperature resulting in a logarithmic phase suspension of mycelial growth.

Subsequently, 200 mL aliquots, of the mycelial culture, were harvested by vacuum filtration onto 9 cm Whatman no. 1 filter paper discs. One sample, time point "0", was immediately frozen in liquid nitrogen. The remaining 18 mycelial mats on Whatman paper disc were placed onto the surface of 40 mL of Vogel's agar (2.0% sucrose, 0.75% agar) within a standard glass Petri plate. Plates were numbered and placed in randomized positions under constant fluorescent light in a bio-safety cabinet with a lowered glass sash and the blower turned off.

At hours 1, 2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 the mycelial mat was harvested from the Whatman paper disc and immediately frozen in liquid nitrogen. At the 12, 14, 16, and 18-hour time points, the aerial hyphae were separated from the vegetative portion of the mycelial mat, by peeling with the aid of a razor blade (Toledo et al., 1986). For these four time points each tissue type (aerial and vegetative) was flash frozen and stored separately. Simultaneous to the harvest of plates microscopic analysis

and photo documentation was performed, using designated parallel cultures, to assess the developmental stage at each time point. Based on the morphological characteristics in these cultures, nine of the fourteen time points were selected to represent development, both the aerial and mycelial tissues of the 12 hour culture were used in our analysis, and only the aerial tissue was used for 14 and 18 hours.

RNA extraction

Total RNA was harvested from each sample by grinding the tissue to fine powder, under liquid nitrogen, in a mortar and pestle, RNA was then isolated using TRIzol® Reagent (Invitrogen) following the manufacturer's protocol. The RNA was then purified using an RNAeasy kit (Qiagen) following the manufacturer's protocol.

cDNA synthesis, labeling, hybridization, and image acquisition.

cDNA synthesis, labeling, hybridization, and image acquisition were performed by Takao Kasuga in Louise Glass' lab at UC-Berkeley according to the protocols described in Dunlap et al., 2007.

Experimental design and statistical analysis

A "cross circuit" design was used to compare samples across differing time points in our microarray (Fig. 13). Cross circuit designs increase the robustness of comparisons on spotted microarrays (Townsend, 2003). Hybridized spots with one or more mean fluorescence intensities of Cy3 or Cy5 that were higher than mean background intensity plus three standard deviations with greater than two percent of the pixels saturated were used for further analysis (Yang and Speed, 2002). Bayesian Analysis of Gene Expression (BAGEL) software was used to generate an expression

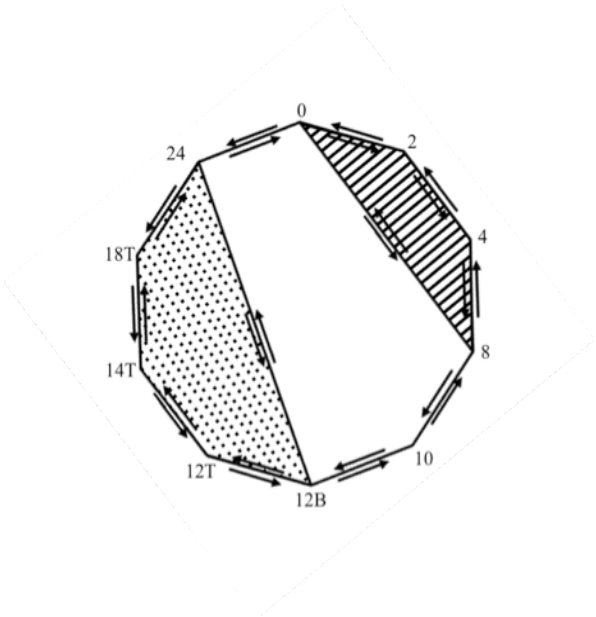

Fig. 13: Microarray experimental design for *Neurospora* conidiation time course. Each arrow represents hybridization; with arrows pointing in opposite orientations representing dye swap experiments. The striped area represents data from earlier time points; the dappled area represents data from late points.

profile and confidence intervals for each gene, specifically these are the normalized ratio data from the BAGEL output (Meiklejohn and Townsend, 2005). Also, we recognized that during development certain genes might be expressed at low levels at the early or late time points. Since there would be missing hybridizations associated with these genes these data are excluded from analysis by the BAGEL software. To recover additional information about these genes, we separately analyzed the more inclusive "early" and "late" subsets of the data using BAGEL (Fig. 13, striped and dappled areas respectively). Following BAGEL analysis, we classify genes as "significantly" regulated if the expression profile intervals contained non-overlapping 95% confidence intervals. These genes were then used for subsequent analyses. Gene accession numbers were annotated according to Assembly 7 version 1 at the Broad Institute Fungal Genome

Initiative database. Significantly regulated genes were also classified according to their major annotation in the MIPS Functional Catalogue (FUNCAT) (FUNCAT annotations obtained from *Neurospora crassa* Functional Genomics Database http://www.yale.edu/townsend; gene list updated March 2006) (Ruepp et al., 2004). We used JMP 8.01 for cluster analysis (Hierarchical, Ward's minimum variance method) to produce the heat map. Relative expression levels are ratios of a given time point relative to the zero time point for that gene. Where indicated these data have been $\log_2$-transformed. To determine whether there were differences in the functional categories in each cluster, the distribution within each cluster was compared to the total distribution of all the annotated genes using independent chi-square tests.

Results and Discussion

Developmental time course analysis of well-characterized conidiation-specific genes

The development of conidiophores and conidia from vegetative tissue proceeded as observed in previous studies (Springer, 1993). At two hours post-induction aerial hyphae emerged from the substrate mycelium and by 6 hours a uniform layer was observed. Rare minor constrictions were visible at 4 hours and common from 6 to 10 hours of development. Major constriction chains were first observed at 10 hours and uniformly distributed by 12 hours. Free conidia were observed starting at 14 hours. The upper layer of cell material, including the developing aerial hyphae are easily separated from the more firmly adhered substrate mycelium by scrapping the surface with a razor blade. This was done to generate a "Top" and "Bottom" sample for the 12-hour sample, and "Top" samples for 14 and 18-hour samples for RNA isolation.

The initial BAGEL analysis comparing all ten samples (Fig. 13) identified 2262 genes significantly regulated across all time points. For some genes data was only available for early time points (0 to 8 hour) or late time points (12 to 24 hour samples). Analysis of the subsets of data for these genes identified an additional 379 genes with non-overlapping confidence intervals within these time points. The 2641 total (Appendix E, Table E1) represents over 20% of the *N. crassa* genome exhibiting differential expression during conidiation. The expression of previously characterized conidiation-specific genes *con-3* (*acu-6*), *con-6*, *con-8* and *con-10* (Fig. 14) was consistent with established patterns (Berlin and Yanofsky, 1985a). Expression of *con-3* was induced at 8 hours, consistent with the previous northern blot data showing weak induction as early as 2 hours with increasing expression peaking at 8 and 12 hours. In our microarray analysis, the induction is at 8 hours, but does reach a maximum at 10 and 12 hours. The *con-6* gene is typically induced at 8 to 10 hours, slightly early than *con-10*, and *con-8* (Berlin and Yanofsky, 1985a), however, in our time course expression data for *con-6* did not pass filtering prior to the 12 hour time point. In addition, mRNA from *fl*, a transcription factor required for conidiation, was only reliably detected at the 12-hour and later time points (Fig. 14) (Bailey and Ebbole, 1998). Thus we conclude our experiment represents a typical developmental time course of conidiation.

It should be noted that the developmentally regulated gene *eas*, was not reported as a reliably detected gene past 8 hours. The gene was induced early in development;

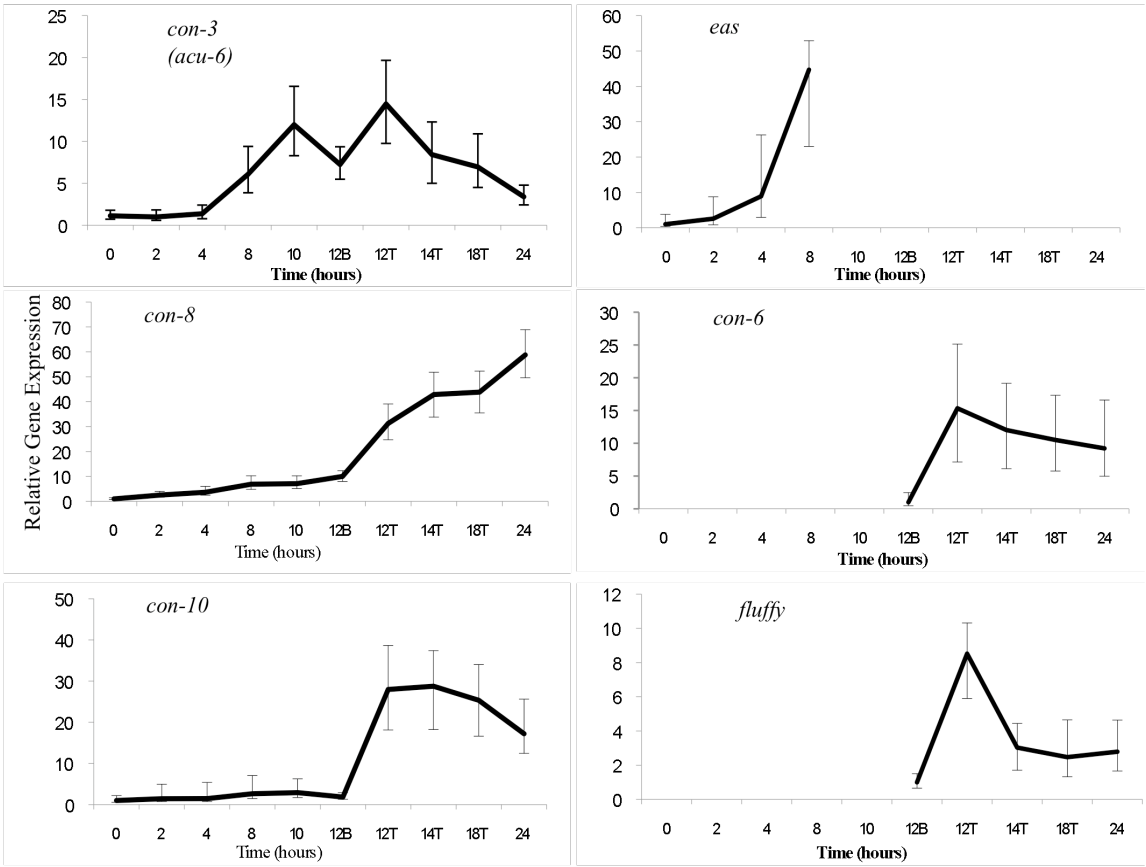

Fig. 14: Relative expression of conidiation-associated genes. BAGEL was used to generate relative gene expression. The relative expression of *con-6*, *con-8*, *con-10*, *eas*, *con-6*, and *fluffy* is shown. The error bars indicate the 95% confidence interval for each time point.

however, at the 10-hour time point and beyond, the signal intensity was so great for that spot that it was flagged as an error and not analyzed further. It is likely that this trend for *eas*, which is the most highly expressed gene during conidiation (Berlin and Yanofsky, 1985a), is atypical for other genes.

Classification of gene expression patterns

For the 2262 BAGEL significant genes with expression detected at all time points, a clustering analysis was performed (Appendix E, Fig. E1).

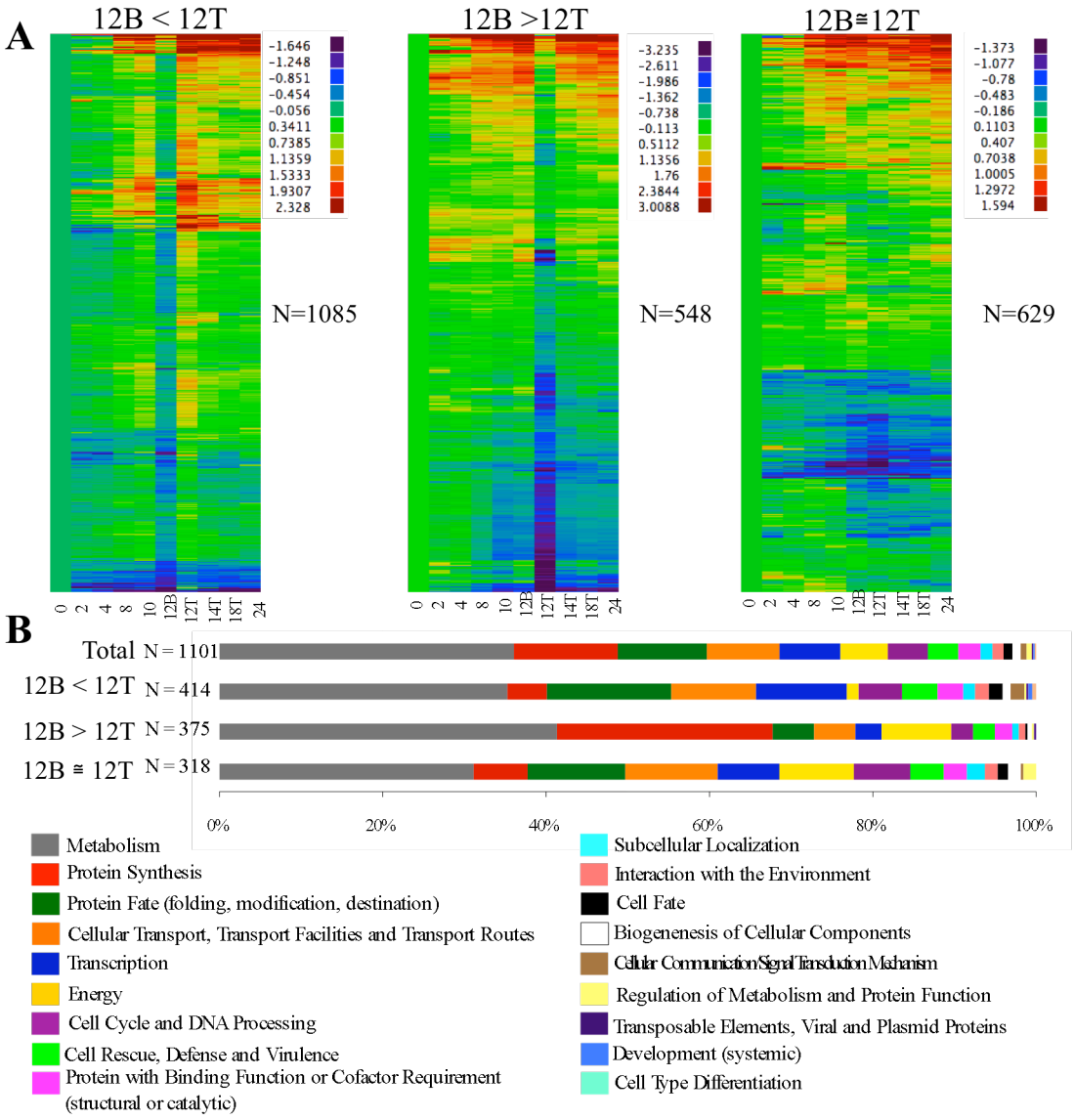

Fig. 15: Expression profiles for significantly regulated genes and FUNCAT category distributions. 3A: The 2262 genes identified as significantly regulated based on non-overlapping confidence intervals in a BAGEL analysis. Genes are grouped according to their tissue specific relative expression at 12 hours. A one-way cluster analysis with corresponding heat maps are shown for each 12B versus 12T comparison. The expression profiles are normalized to time zero and $\log_2$ transformed. Thus, all data represent either an increase or decrease of gene expression relative to time zero. 3B: A total of 1101 genes classified according to their major FUNCAT listing as well as individual classifications for each 12B versus 12T comparisons. The bar graphs represent the percentage of each category for the total number of genes and for each cluster.

From this, we observed differential gene expression for many genes in the 12-hour "Top" (12T) and 12-hour "Bottom" (12B) samples (Appendix E, Fig. E1B). This led us to divide the genes into three subgroups based on clustering of genes with respect to their behavior in these two samples corresponding to genes with lower relative expression levels in 12B compared to 12T (12B<12T), genes with greater relative expression at 12B versus 12T (12B>12T), and genes with similar relative expression levels at 12B and 12T (12B≅12T) (Fig. 15A). For example, in the 12B<12T group (Fig. 15A, left panel) the level of expression of genes in the 12B sample displayed a pattern of expression similar to the T = 2 and T = 4 hour time points. The pattern of gene expression in the 12T sample is very similar to the 14T, 18T, and 24 hour samples. The 8-hour sample and the 10-hour sample had a hybrid pattern (similar to a combined 12B and 12T sample) of gene expression, with 8 hours more similar to 12B and 10 hours more similar to 12T. This suggests that as the mass of aerial tissue increases, the overall gene expression pattern of the combined culture begins to resemble the pattern of the aerial tissue for aerial hyphae-specific transcripts. In contrast, genes in the 12B>12T samples (Fig. 15A, middle panel) displayed an expression pattern where the 12T sample was quite different from the 14T and 18T samples. However, the 14T and 18T aerial tissue samples have expression patterns that are more similar to the 12B sample. The 12T sample represents the time point at which the transition to major constriction chains is occurring and conidia formation is beginning to take place. The similarity of the 12T, 14T, and 18T samples for 12B<12T genes suggests that these genes represent development-specific genes. The similarity of 12B, 14T, and 18T for the 12B>12T

sample may reflect that as conidial development proceeds beyond 12 hours, genes important for spore germination, in addition to genes required for conidial development are also being packaged into spores. The genes in this group may represent the subset of genes that may be needed for vegetative growth upon conidial germination. The 12B≅12T genes (Figure 15A, right panel) are differentially expressed during conidiation, but do not show tissue specificity (aerial hyphae versus mycelial mat) at the 12B and 12T time points.

The identification of tissue specific gene expression is a major finding in this study. The patterns in the 12B<12T and 12B>12T groups show that the mycelial mat is an active tissue during conidiation and may supply nutrients and transcripts for transport into aerial tissue. Furthermore, we queried genes and gene networks with known biological functions to gain a better understanding of what roles they play both spatially and temporally. For example, transcripts expressed at a higher level in the mycelium versus the aerial hyphae at 12 hours (12B>12T) are enriched for protein synthesis and ribosome component annotations. It is important to note that a majority of these genes are down regulated in the aerial tissue at 12 hours. Genes classified as having metabolic functions are found evenly distributed in the 12B<12T, 12B>12T, and 12B≅12T groups. Overall, the majority of the genes classified as being involved in metabolism, are up regulated during conidiation. Up to 12 hours aerial hyphae and conidiophores are continuing to grow and bud, however, by 14 hours conidial maturation is occurring and free conidia are beginning to be produced. We might expect that genes involved in conidiogenesis would be induced in aerial tissue prior to 12 hours, and by 14 hours,

coinciding with maturation of conidia; these genes would no longer be needed. In fact we see many of the known developmental regulators (*fl*, *medA*, *acon-4*, *csp-1*) expressed with this pattern during the time-course (see below). In the 12B<12T panel in Fig. 15A, we see a large group of genes that display increasing levels of expression that are higher leading up to 12 hours in the aerial tissue and have reduced expression at later time-points. Interestingly, the expression pattern for 12B>12T genes induced in the aerial tissue at 14 hours and later mirrors the time course for expression of genes in the combined tissue at the early time points. Genes involved in glycolysis (see below) are regulated in this fashion. This expression pattern of early time points in the 12B>12T group could represent gene expression for tissue entering a stationary phase (not actively growing), which may resemble the gene expression pattern in conidia preparing for dormancy at 14 hours and later time points. The mycelial mat reaches this state during the first several hours of the time course. The aerial hyphae and conidiophores may initiate a similar pattern of gene expression starting at 14 hours.

Glucose and energy metabolism

Genes classified as being involved in metabolism were relatively abundant in the 12B>12T group indicating that some metabolic pathways are either up-regulated in the substrate mycelium or down-regulated in the aerial hyphae at the 12 hour time point. The transition from culture medium to harvested mycelial pad is thought to induce a hyper-oxidative state that serves as a signal for differentiation (Aguirre et al., 2006). Thus, changes in gene expression in the early time points (2 and 4 hours) may reflect adaptation to the new environmental state as well as early events in development.

The median expression ratios of genes involved in glycolysis (Fig. 16, glycolysis) remain relatively constant in the mycelial pad, but decline in aerial hyphae, especially at 12 hours. The 12-hour time point appears to have captured a critical point in development since recovery of a mycelial-like expression pattern for these genes is apparent in the 14 and 18 hour-old aerial hyphae. In previous studies, the transcriptional response of many genes to glucose starvation, was observed (Xie et al., 2004). The same pattern of expression for genes involved in glycolysis and gluconeogenesis (described below) is observed. Questions arising from these changes in expression of genes for glucose metabolism are whether this simply represents a starvation condition that results from aerial growth, whether this starvation provides a signal for morphological events or if the changes in gene expression are not a reflection of nutrient limitation, but may instead be a result of a developmental program regulating their expression.

The expression of the gene for PEP carboxykinase (NCU09873), a rate-limiting step in gluconeogenesis (Fig. 16, Gluconeogenesis and Lipid Metabolism), and 3-ketoacyl-CoA thiolase (NCU04796), a key enzyme in fatty acid degradation, are up regulated in the aerial tissue relative to the mycelial mat. The increase in expression for these genes is observed in the combined tissues beginning at 8 hours after induction of conidiation, corresponding to the transition from aerial hyphal growth to formation of

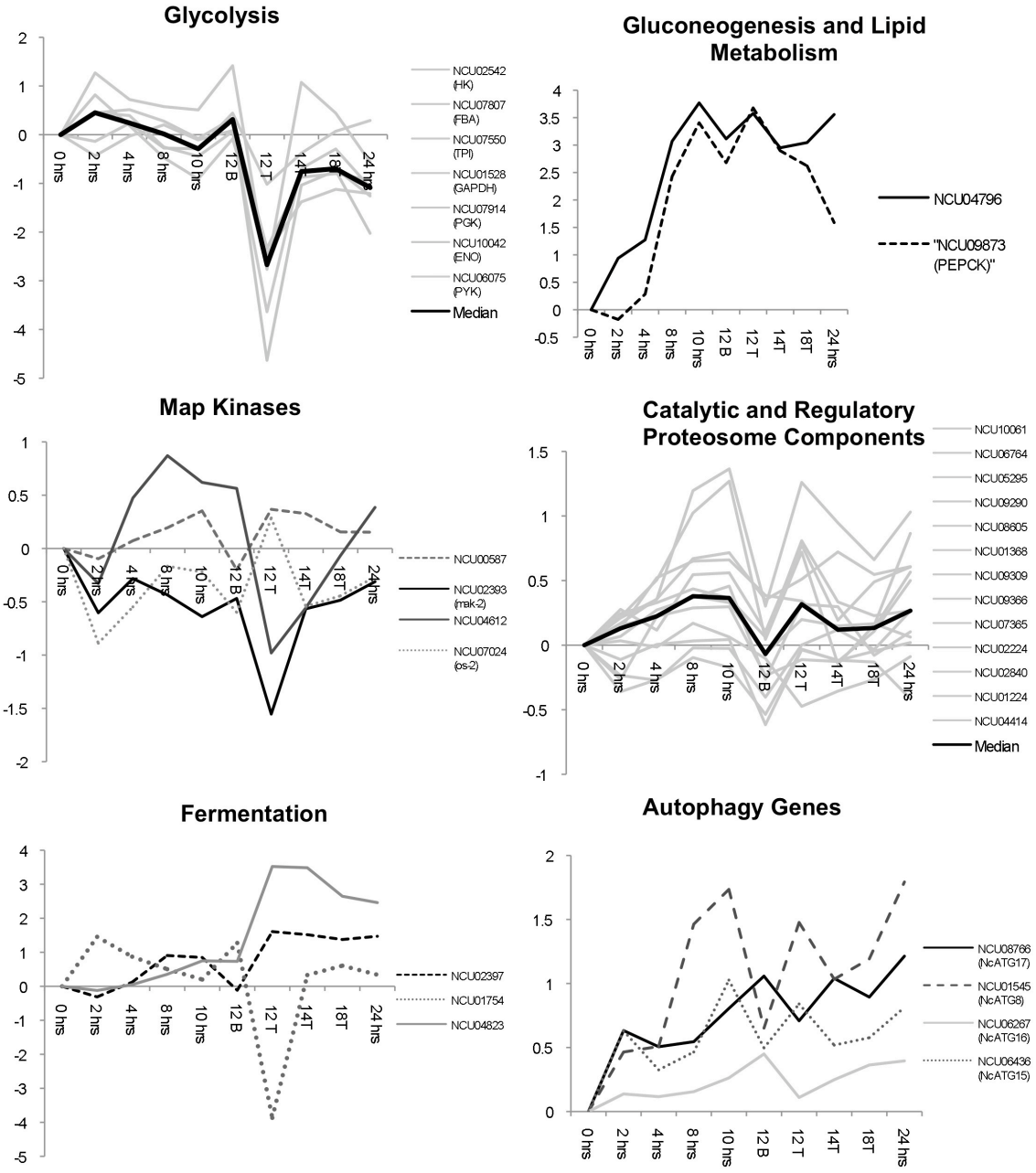

Fig. 16: Expression levels of major biological processes. Graphs represent relative gene expression levels (log_2) relative to time 0. Genes were identified from lists found in Borkovich et al., 2004 and Xie et al., 2004. Median expression levels for Proteosome Components and Glycolysis are shown as the bold line in graphs.

proconidial chains. The maximum level of expression for these genes was observed in the aerial hyphae at 12 hours. This observation suggests that fatty acid degradation in aerial tissue is supplying substrate for gluconeogenesis.

Pyruvate decarboxylase (NCU02397) (Fig. 16, Fermentation) was induced in aerial tissue at 12 hours, which is surprising given the view that gluconeogenesis predominates in aerial tissue since pyruvate decarboxylase converts pyruvate to acetaldehyde. While phosphoenylpyruvate, produced during gluconeogenesis, would not be expected to be converted back to pyruvate to serve as a substrate for pyruvate decarboxylase, it is unclear what the role of elevated transcripts for this gene might be. An alcohol dehydrogenase (NCU01754) was induced 2 to 3-fold in the substrate mycelium but the transcript level in the aerial tissue was 35-fold lower than in the 12 h mycelium. A second alcohol dehydrogenase homolog (NCU04823) was induced in aerial tissue; however, it seems unlikely this is involved in the metabolism of ethanol. Genes in the citric acid cycle were largely unregulated, although some of the detected genes (Appendix E, Table E1) displayed a reduction of about 2-fold in the 12 h aerial tissue (but not in the 14 or 18 h aerial tissue). Overall, we conclude that gluconeogenesis is occurring in both the mycelium and aerial hyphae to produce substrate for growth of the aerial hyphae. Some carbon is being used to provide energy through glycolysis and respiration. Fermentation to ethanol is not likely to be occurring rapidly since the pyruvate decarboxylase expression is not elevated in the substrate mycelium where glycolysis appears to be the most active. The elevated transcript levels for PEP carboxykinase in the mycelium suggest that the substrate mycelium is actively

engaged in metabolism and is not simply being autodigested to provide precursors for aerial growth.

In eukaryotes, the proteasome is important in the recycling of proteins (Coux et al., 1996). One model for development is that protein recycling is highly induced in the mycelial pad and that protein turnover could provide substrates for transport into aerial hyphae to support growth. However, we observed that there was no strong induction of genes for proteasome synthesis is the mycelium; rather, the signal for some proteasome components is higher in the aerial tissue than in the mycelium (Fig. 16, Proteasome components). We also did not find evidence for induction of genes for autophagy in the mycelium (Fig. 16, Autophagy genes). Although we measured transcript levels only, and cannot exclude the possibility that transcript levels do not correspond to the activity of the proteasome or autophagy. The overall finding of induction of proteases suggests that the majority of the protein recycling that is occurring during asexual development is localized at sites of aerial development and the overall turnover of cellular materials by use of the proteasome or through autophagy is not greatly elevated in the mycelium during development.

Genes involved in breakdown of starch (NCU01517, NCU07027, and NCU06877) were expressed more highly in the substrate mycelium, whereas genes for 1,3-beta-glucan (NCU06871) and trehalose-6-P synthesis (NCU08715) were more abundantly expressed in aerial tissue at 12 h (Table 5). Furthermore, two hexokinase homologs are expressed (Fig. 16, Glycolyis), one, NCU02542, being expressed at a relatively constant level across time and in different tissues whereas NCU04728 has

Table 5: Starch metabolism and hexokinase genes. Relative gene expression of BAGEL signficant starch metabolism and hexokinase genes across time course.

Broad ID	0 hour	2 hour	4 hour	8 hour	10 hour	12B	12T	14T	18T	24 hours
NCU01517	1.00	1.00	1.57	3.28	5.01	9.29	2.43	3.94	4.35	4.10
NCU07027	2.26	4.62	5.82	4.53	3.72	6.33	1.00	3.07	3.60	3.03
NCU06877	1.12	1.15	1.15	1.00	1.12	1.17	1.58	1.30	1.30	1.29
NCU06871	2.54	1.09	1.00	1.06	1.36	1.42	3.77	1.86	1.38	1.41
NCU08715	1.00	1.02	1.11	1.17	1.43	1.28	1.93	1.63	1.66	1.93
NCU04728	1.02	1.06	1.14	1.10	1.03	1.00	2.68	1.55	1.38	1.21

elevated expression in the 12 h aerial hyphae. The hexokinase, differentially expressed in the mycelium, is likely involved in phosphorylation of glucose produced from the breakdown of glycogen.

Several sugar transporter homologs were also regulated during development (Table 6). The low-affinity glucose transporter homolog (NCU01633) was elevated in both the mycelium and the aerial tissue at 12 h relative to the mycelium at the time of harvest and this pattern of expression was also observed for two other transporter homologs, NCU00821 and NCU09287. The high-affinity glucose transporter, NCU10021, was elevated in the mycelium at 12 h relative to time 0, however, its expression was not increased in the aerial tissue. This was also true for a second glucose transporter homolog, NCU04963. Glucose transporter homologs NCU05627, NCU01813, and NCU05597, were elevated in the aerial tissue but not in the substrate mycelium at 12 h. The role of glucose transporter and hexokinase NCU04728 gene induction in aerial hyphae is unclear since we expect glucose and other sugars to be

Table 6: Sugar transporters. Relative gene expression of BAGEL significant sugar transporter genes

Broad ID	0 hour	2 hour	4 hour	8 hour	10 hour	12B	12T	14T	18T	24 hours
NCU01633	1.02	3.19	2.78	2.64	2.72	5.32	1.00	1.97	2.16	1.45
NCU00821	1.71	1.00	2.15	4.10	4.37	5.49	4.75	6.37	6.81	7.51
NCU09287	1.00	1.02	1.34	1.89	2.13	2.42	2.47	2.47	2.47	3.15
NCU10021	1.00	1.68	3.05	3.59	3.63	7.88	1.02	2.80	4.54	5.25
NCU04963	1.00	6.16	14.79	29.16	29.80	88.25	1.65	32.01	40.32	32.80
NCU05627	1.00	2.11	3.15	4.11	5.83	9.31	2.20	4.52	4.76	4.27
NCU01813	1.18	1.00	1.41	2.33	3.95	1.51	3.36	3.37	3.03	4.58
NCU05597	1.06	1.12	1.19	1.97	2.92	1.00	6.39	2.95	2.97	3.53
NCU05597	1.06	1.12	1.19	1.97	2.92	1.00	6.39	2.95	2.97	3.53

transported intracellularly, or synthesized via gluconeogenesis, from the mycelium to the aerial tissue and transporters would not be needed in to import glucose from the outside of the aerial hyphae. It is possible that these transcripts and/or their products are produced in order to prepare the nascent conidia for sugar uptake upon germination. It is important to note that NCU05597 is *asd-3* (ascus development), a protein required for ascospore maturation and is thus a transporter known to be associated with developmental processes.

Amino acid and nitrogen metabolism

Glutamine synthetase is oxidatively inactivated and degraded upon harvesting the mycelium for induction of development (Sánchez et al., 1980). The expression of two glutamine synthetase homologs (NCU04856 and NCU06724) was detected. The genes appear to have arisen by gene duplication as the predicted protein sequences share 82% identity. *Neurospora* is known to possess two enzymes, one of which NCU06724 (*gln-1,*

glutamine) is required for growth in the absence of glutamine. The proteins form a complex and both are inactivated and degraded on aerial induction of conidiation. NCU06724 expression declined approximately 2-fold (4.1 to 1.7) from time 0 to 2 h after harvesting. The level of expression remained relatively constant after that time in all tissues. The transcript level for NCU04856 was similar in the mycelium at 0 and 12 h but was reduced 14-fold specifically in the 12 h aerial hyphae. However, in general genes for nitrogen metabolism did not show large changes in expression levels.

Stress response

Oxidative stress has been noted as a strong signal for induction of microbial sporulation (Aguirre et al., 2006). Previous studies (Chary and Natvig, 1989; Wang et al., 2007) identified *cat-1* (NCU08791) as being expressed in actively growing mycelial tissue as well as increasing conidia viability. The level of both *cat-1* and *cat-4* (NCU05169) increase throughout asexual development, especially in the aerial hyphae. Another catalase, *cat-2* (NCU05770), was induced during development but did not display tissue specificity.

Other genes known to be involved in the response to stress such as the heat shock protein genes *hsp30* (NCU10055) and hsp70 (NCU04415) were found induced in aerial hyphae. Mutants of *hsp30* were shown to be extremely sensitive to the combination of elevated temperatures and carbohydrate deprivation (Plesofsky-Vig and Brambl, 1995). In addition the ortholog of *S. cerevisiae Ire1* is elevated in aerial tissue. *Ire1* is a membrane bound protein kinase and endoribonuclease that mediates the unfolded protein response. *Ire1* is activated upon stress conditions affecting the endoplasmic

reticulum (Back et al., 2005). This may reflect the scavenging of proteins within the aerial tissue in response to environmental stress during the development of aerial hyphae or as part of a program to enhance the removal of protein during the course of development once they are no longer needed.

Table 7: *N. crassa* transcription factors. Relative expression of BAGEL significant *N. crassa* transcription factors with knockout phenotypes.

Name	Broad ID	0 hrs	2 hrs	4 hrs	8 hrs	10 hrs	12 B	12 T	14T	18T	24 hrs
acu-15	NCU06656	1.00	1.43	1.15	1.72	1.85	2.00	1.37	1.61	1.60	2.60
col-27	NCU08651	1.38	1.73	1.95	2.30	2.73	1.00	1.48	1.56	2.17	2.31
col-21	NCU03489	1.25	1.30	1.33	1.44	1.59	1.00	1.69	1.53	1.58	1.38
lah-3	NCU03686	1.80	1.32	1.32	1.46	1.61	1.38	1.00	1.01	1.39	1.35
ada-5	NCU03931	1.20	1.07	1.07	1.02	1.00	1.08	1.52	1.10	1.18	1.15
sah-3	NCU07374	1.33	1.23	1.27	1.36	1.51	1.00	1.76	1.45	1.55	1.26
sah-1	NCU04179	1.00	2.16	1.73	2.63	2.39	1.41	1.84	2.01	1.94	2.10
csp-1	NCU02713	1.00	1.73	1.17	1.38						
sah-2	NCU04731						1.00	1.34	1.08	1.05	1.01
asl-2	NCU01459	1.00	1.17	1.24	1.64	2.05	1.07	2.49	1.79	1.81	1.67
ada-1	NCU00499	1.00	1.63	1.65	2.29	2.97	3.93	2.21	2.35	2.68	4.66
kal-1	NCU03593	1.34	1.98	1.47	1.43	1.38	1.45	1.04	1.01	1.00	1.09
	NCU08307						1.00	5.12	1.92	1.23	1.00
acon-4							1.00	6.05	2.43	2.17	3.00
fl	NCU08726						1.00	8.52	3.03	2.47	2.79
acon-3	NCU07617	1.37	1.25	1.34	1.63	2.17	1.00	3.56	2.00	1.93	1.75
csp-1							1.00	6.05	2.43	2.17	3.00

Signal transduction

Previously described and novel transcription factors were knocked out in *N. crassa* (Colot et al., 2006). Several transcription factors were identified as being regulated during our developmental time course. All of the significantly regulated transcription factors identified on the array (Table 7) exhibit observable altered development phenotypes in the knockout mutant. However, the transcription factors were among those genes that were only moderately regulated. Nonetheless, this may also

suggest the possibility of post-translational modifications of these factors may play a role in their regulation of other genes. In addition to those characterized previously (Table 6), we found orthologs of developmental regulators in *A. nidulans* corresponding to *flbC* and *medA* (Table 8). The corresponding mutants are defective in conidiation, suggesting that they play a central role in regulating this developmental process.

Table 8: Previous identified conidiation-associated genes in *N. crassa* and *A. nidulans*. Data is Relative expression of BAGEL significant of know conidiation-associated genes.

Gene Name	Reference Organism	Broad ID	0 hrs	2 hr	4 hr	8 hr	10 hr	12 B	12 T	14T	18T	24 hr
con-13	N. crassa	NCU07324						1.0	20.0	3.1	1.7	3.1
con-6	N. crassa	NCU08769						1.0	15.3	12.0	10.5	9.2
csp-1	N. crassa	NCU02713	1.0	1.7	1.2	1.4						
eas	N. crassa	NCU08457	1.0	2.6	8.9	44.7						
fl	N. crassa	NCU08726						1.0	8.5	3.0	2.5	2.8
flbC	A. nidulans	NCU03043						1.0	6.1	2.4	2.2	3.0
vib-1	N. crassa	NCU03725	1.0	1.9	2.1	2.7						
al-1	N. crassa	NCU00552	1.0	1.1	1.1	1.1	1.5	1.3	2.6	1.4	1.3	1.2
al-2	N. crassa	NCU00585	1.0	3.1	2.7	2.0	2.1	1.3	3.3	1.5	1.1	1.3
al-3	N. crassa	NCU01427	1.0	1.0	1.2	3.9	13.1	2.8	20.1	6.0	6.1	7.3
catA	A. nidulans	NCU08791	1.0	1.2	1.6	2.4	2.6	2.6	6.4	5.3	4.8	5.8
ccg-4	N. crassa	NCU02500	3.7	3.4	3.1	4.2	3.4	4.2	1.0	1.7	4.0	7.4
con-10	N. crassa	NCU07325	1.0	1.4	1.5	2.6	2.9	1.9	28.0	28.8	25.4	17.2
con-8	N. crassa	NCU10997	1.0	2.5	3.7	6.9	7.1	10.0	31.3	42.9	43.9	58.8
flbD	A. nidulans	NCU01312	1.1	1.3	1.3	1.5	1.6	1.0	2.2	1.7	1.5	1.6
medA	A. nidulans	NCU07617	1.4	1.3	1.3	1.6	2.2	1.0	3.6	2.0	1.9	1.8
stuA	A. nidulans	NCU01414	1.7	1.0	1.2	1.7	2.0	1.4	2.9	1.7	1.7	2.4

The expression of MAP kinases *mak-2* (pheromone response pathway) and *os-2* (osmolarity) (NCU02393 and NCU07024) shows relatively level expression across the time course, except at 12 hours (Fig. 16, MAP Kinases). At 12 hours, *mak-2* is significantly lower in the aerial tissue compared to the mycelial pad, and *os-2* shows the opposite pattern. The MAPKKs that are orthologous for the osmolarity (NCU00587) and pheromone (NCU02393) pathways in yeast showed similar patterns of expression to *os-*

2 and *mak-2.* Mutants of *mak-2* are induced for conidiation and are lacking in aerial hyphae, similar to *cr-1*. Consistent with *mak-2* inhibiting conidiation, observed a two-fold decline in *mak-2* transcript levels in the aerial hyphae at 12 hours. A decline in activity of the mak-2 pathway is expected in aerial tissue since the mak-2 mutant is derepressed for conidiophore production and does not produce aerial hyphae (Pandey et al., 2004). Once aerial hyphae are produced, a decline in *mak-2* transcript levels may correspond to a decrease in the activity of the pathway, which would promote conidial morphogenesis.

Summary

This microarray study reveals significant patterns of expression during conidiation in *N. crassa.* Separation of tissue layers (aerial hyphae and mycelial mat) at sample collection allowed for observations comparing RNA levels in the respective tissues. Previously identified conidiation-specific genes (*con-8*, *con-10*) and other known developmentally regulated genes (for example, *al-1*, *al-2*, and *al-3* for carrotenoid synthesis) were induced specifically in the aerial hyphae. Genes for *con-6*, *con-13*, and *eas* were identified as being regulated genes in the microarray only in early or late samples since they were not reliably detected throughout the entire time course. *eas* was detected in the early time points (0 through 8 hours). The signal for *eas* was very high in the later time points and saturation of signal made analysis of the level of expression impossible. Signals for *con-6* and *con-13* were too low early in the time course to detect, however, in the 12-hour and later samples, their expression and

induction during development could be detected. Therefore, we analyzed genes expressed only in subsets as the data as well to identify additional interesting genes.

The major finding in this study is the identification of tissue specific (aerial hyphae versus mycelial mat) gene expression during conidiation. Furthermore, we appear to have captured a very important time-point (12 hours) in development. By separating the mycelial and aerial tissue, we were able to observe spatially elevated gene expression levels. This study helps to further our understanding of *N. crassa* development.

CHAPTER V

IDENTIFICATION OF TWO COMPONENTS OF THE ASEXUAL DEVELOPMENT GENE NETWORK IN *Neurospora crassa*, *acon-2* and *acon-3*

Introduction

Two genes that play major roles in the development of *Neurospora crassa* macroconidiophore differentiation are *acon-2* and *acon-3*. *acon-3* mutants are aconidial whereas *acon-2* mutants are temperature sensitive, producing no conidiophores when grown at 34 °C (Matsuyama et al., 1974). Over-expression of *fluffy* (*fl*), a binuclear zinc cluster protein transcription factor necessary for conidiophore production, in the *acon-2* background of *N. crassa*, restores formation of conidia at 34 °C, when grown on solid Vogel's media. In liquid Vogel's media over-expression of *fl* induces conidiation in the wild-type background; however, in the *acon-2* background, at 34 °C, over-expression of *fl* does not induce conidiation except under conditions of nitrogen starvation (Bailey-Shrode and Ebbole, 2004). This suggests that bypassing the block to conidiation caused by *acon-2* requires both *fl* expression and a signal for conidiation (a hyperoxidant state or nitrogen starvation). In contrast, the block in development caused by the *acon-3* mutation is not bypassed by *fl* over-expression. This indicates that *acon-2* acts upstream of *fl*, while *acon-3* acts downstream (Bailey-Shrode and Ebbole, 2004). Identification of the *acon-2* and *acon-3* genes could allow a better understanding of the genetic pathways necessary for *N. crassa* differentiation during asexual sporulation.

Previously, *acon-2* and *acon-3* were mapped (Perkins et al., 2001): *acon-2* maps within ~6 cM of *tyr-1* on LGIII, and *acon-3* maps to within ~6 cM of the left end of LG IV. Inspection of the regions of the genome sequence corresponding to the genetic intervals associated with the genes suggested several candidate loci for each gene. By incorporating the phenotypic data from the *N.crassa* knock-out project for the candidate genes (Colot et al., 2006), it was possible to further narrow the likely candidates for each locus in these regions. The *medA* gene of *A. nidulans* regulates conidiophore morphogenesis and orthologs in other fungal species affect conidiation. NCU07617.4, the *medA* ortholog in *N. crassa* was located in a region close to that expected for *acon-3*. NCU00478.4, an ortholog of *A. nidulans pdeB* , a cyclic AMP phosphodiesterase, was similarly a candidate for *acon-2*. Mutants for NCU07617 and NCU00478 were secured from the Neurospora Genome Project. In both cases, the mutants failed to produce conidia, consistent with the hypothesis that these were the genes responsible for the aconidial phenotypes at the *acon-2* and *acon-3* loci. To test these hypotheses, the *acon-2* mutant and the *acon-3* mutant were crossed to the appropriate KO strain for the hypothesized candidate locus, the candidate locus in each of the mutants was sequenced, and the mutant locus was complemented with a wild-type DNA segment spanning the candidate gene. These experiments confirmed the identities of *acon-2* and *acon-3* and allowed for placement of these genes in the model for the pathway controlling conidiation in *N. crassa*.

Methods and materials

Stock descriptions and cultivation methods

All strains of *N. crassa* were obtained from the Fungal Genetics Stock Center (FGSC). The recipes for media used (described below) are found in Appendix A. Primer sequences are found in Table 1, Appendix B. Plasmid construct definitions are found in Table 2 Appendix B. Crosses were performed according to the procedures described in (Murray and Perkins, 1963). All cultivation of *N. crassa* occurred at 25°C unless otherwise stated. The knockout strains corresponding to NCU00478.4 locus (FGSC#s 11431 and 11432) and NCU07617.4 (FGSC# 21697) were ordered from the stock center (Colot et al., 2006).

Crossing mutants to the knock-out strains for the candidate genes

A cross between *acon-2* (FGSC# 3262) and the NCU00478.4 knockout strain (FGSC# 11431) was performed. The knockout strain was used as the female, with the mutant overlaid as the male. Ascospores were isolated and transferred to individual slants of Vogel's medium supplemented with yeast extract. Crosses between the female sterile *acon-3* (FGSC# 3286) strain and the NCU07617.4 knockout strain were performed between themselves and the wild type strain. These were grown for 6 days at 34 °C, in constant light, and subsequently scored for phenotype.

Sequence analysis

Sequencing of the NCU00478.4 and NCU07617.4 locus was performed at the Gene Technologies Laboratory (GTL), Texas A&M University. Briefly, The coding regions for the NCU00478.4 locus and the NCU07617.4 locus of *acon-3* were amplified

using primers ACON2for2 and NCU00477Rev, from the *acon-2* strain, and NCMEDAfor2 and NCMEDArev1, for the *acon-3* strain. These PCR products (2 for NCU07617.4) were inserted into pCR®4 vector using the manufacturer's protocol (Invitrogen, Carlsbad, CA), and transformed into chemically competent *Escherichia coli.* The resulting transformants were screened for the presence of the insert via *Eco*R1 digestion. The vector and insert DNA was purified using a QiaPrep Spin Miniprep Kit (Qiagen, Cat# 27104). The inserts were sequenced (Gene Technology Laboratory, Texas A&M University). The primers used to sequence the full-length insert of the *acon-3* insert were NCMEDAfor1, NCMEDAfor2, NCMEDAfor3, NCMEDArev2, NCMEDAfor4, NCMEDArev3, and NCMEDArev1. The primers used to sequence the full-length insert for *acon-2* were ACON2for1, ACON2for2, ACON2for3, ACON2for4, ACON2for5, ACON2for6, ACON2rev1, ACON2rev2, ACON2rev3, ACON2rev4, ACON2rev5, ACON2rev6, and NCU00477Rev.

Complementation of acon3

The NCU07617.4 locus was amplified from wild-type *N. crassa* strain 74-OR23-1VA (FGSC# 2489) with primers NCMEDAfor1 and NCMEDArev1 using FideliTaq™ DNA polymerase. Cycling conditions consisted of an initial hold of 95 °C for 2 minutes; 40 cycles of 95 °C for 1 min, 56 °C for 30 seconds, 68 °C for 5 min; and a final extension at 68 °C for 5 min. The resulting 4,897 bp PCR product contained coding region along with 2,118 bp upstream and 419 bp downstream of the coding region. The PCR product was inserted into a pCR®4 vector using the manufacturers protocol (Invitrogen, Carlsbad, CA), and transformed into chemically competent *E. coli*.

Subsequently, the resulting plasmids were digested with *Eco*RI to screen for a 4,920 bp band, corresponding to the appropriate integration of the insert. The *Eco*RI digested insert was gel purified and ligated into vector pCB1004 (Carroll et al., 1994) to produce pCG1.

Transformable spheroplasts of *N. crassa acon-3* (FGSC # 5074) were generated according to the previously described protocol (Yamashiro and Royer, 1992). Briefly, a culture of *acon-3* was grown in 100 mL of Vogel's minimal medium, over the course of three days. On the first day, a small inoculum of *acon-3* hyphae was used to inoculate 100 mL of minimal media. After each day of growth in a shaking incubator (34 °C, 200 rpm), the mycelial suspension was blended; and 30 mL was used to inoculate the next day's growth in 100 mL of fresh liquid media (total 130 mL). After growth, spheroplasts were generated and transformed with 1 µg of pCG1. The transformed spheroplasts were suspended in top agar medium and overlaid on FGS medium containing 250 µg/mL hygromycin. After transformants grew for three days to form colonies, they were picked to tubes containing Vogel's medium and 250 µg/mL hygromycin. The resulting transformants were screened for presence or absence of conidia. Homokaryons of the conidiating cultures were generated by streaking on FGS plates according to the previously described protocol (Ebbole and Sachs, 1990).

Complementation of acon-2

The NCU00478.4 locus of *N. crassa* was amplified from wild-type *N. crassa* with primers ACON2for1 for and ACON2rev1 using Phusion® Flash DNA polymerase (New England Biolabs, Ipswich, MA). Cycling conditions were an initial hold of 98 °C

for 10 seconds; 35 cycles of 98 °C for 0 sec, 70 °C for 5 seconds, 72 °C for 69 seconds; and a final extension at 72 °C for 1 min. The resulting 3,768 bp PCR product corresponds to 1,099 bp upstream of the predicted start codon to 100 bp downstream of the predicted stop codon. The PCR product was purified using a PCR cleanup column (Promega, A9280). The PCR product was eluted in 15 μL deionized H_20. 3′ A-Overhangs were added using Taq Polymerase (NEB, M0267S). Briefly, the eluted PCR product, 2.5 μL 2X Thermopol Reaction Buffer, 0.5 μL dATP (10 mM), 2 units TAQ polymerase, and deionized H_20 to make 25 μL were combined. This reaction was incubated at 72 °C for 10 minutes. Immediately following, 4 μL of this reaction was used in the subsequent TA cloning reaction. The PCR product was inserted into a pCR®8 vector using the manufacturer's protocol (Invitrogen, Carlsbad, CA), and transformed into chemically competent *E. coli*. Subsequently, the resulting plasmids were digested with *Eco*RI to screen for a 3,791 bp band, corresponding to the appropriate integration of the insert. The *Eco*RI digested insert was gel purified and ligated into vector pCB1004 (Carroll et al., 1994) to produce pCG2.

A culture of *acon-2* (FGSC# 3286) was grown in a 250 ml flask containing 50 mL Vogel's agar (2% agar) supplemented with 1.0% yeast extract for 3 days at 25 °C in constant light. The resulting conidia were harvested with 50 mL sterile 1 M sorbitol and filtered through sterile miracloth (Calbiochem# 475855). The conidia were quantified using a hemocytometer and suspended at 8 x 10^8 conidia/mL in 1 M sorbitol. Lysing enzyme (Sigma L-1412) was added at a concentration of 20 mg/mL and the solution was allowed to incubate for 1 hour at 28 °C, 200 rpm in a shaking incubator. The conidial

suspension was centrifuged for 5 minutes at 500 x g and 4 °C. The conidia were washed twice, using 1M sorbitol, maintained on ice, and resuspended in 1 M electroporation buffer (1M sorbitol, 1% PEG 4000), also maintained on ice, at a concentration of 10^8 conidia/mL. A 400 µL aliquot of conidia in electroporation buffer was mixed with 2 µg pCG2. This mixture was transferred to a pre-chilled cuvette (0.2 cm gap, Bio-Rad, Cat# 165-2086). Electroporation was performed using three pulses in rapid succession (~1 sec) (750V, 600 ohms, 25 µF). The cuvette was incubated on ice for 10 min. Outgrowth medium was added to the reaction and incubated at 30 °C for 1 hour. 50 mL of top agar, maintained at 40 °C, was mixed with electroporation reaction and subsequently overlaid on top of FGS bottom agar medium containing 250 µg/mL hygromycin B (Calbiochem, 400052). The resulting transformants were screened for presence or absence of conidia after growth at 34 °C, for 3-5 days. Homokaryons of the conidiating cultures were generated by streaking on FGS plates according to the previously described protocol (Ebbole and Sachs, 1990).

Homology searches

The predicted amino acid sequences for NCU00478.4 and NCU07617.4 were used to query the genomes of several species within the Ascomycota and Basidiomycota. Homologs were detected using TBLASTN.

Results

Identification of acon-2

The cross between *acon-2* and the knockout strains of NCU00478.4 was fertile, we scored 316 progeny for conidiation at 34 °C, all were aconidial, suggesting *acon-2*

and NCU00478.4 are the same locus. After multiple unsuccessful attempts at amplifying the NCU00478.4 locus from *acon-2* genomic DNA using primers that worked for the wild-type locus, we designed a new primer (NCU00477Rev) that was located in the coding region of the adjacent gene, NCU00477. Amplification of the NCU00478.4 region from the *acon-2* mutant using this new primer and the previously used primer upstream of NCU00478 generated a PCR product was over 1,500 base pairs smaller than the PCR product amplified from the wild type strain. Sequencing the NCU00478 locus PCR product from the *acon-2* strain revealed a 1,693 base pair deletion that spanned 757 base pairs of the C-terminus of NCU00478.4, including the stop codon. This creates a loss of 252 amino acids of the predicted C-terminus, shifts the stop codon to within the intergenic region with the addition of 23 amino acids (Fig. 17A) (Appendix C Table C1. Transformation of the *acon-2* mutant strain with a PCR generated fragment containing 1 kb of DNA upstream of the coding region and 23 bp downstream of the wild-type NCU00478 gene restored the wild-type phenotype (macroconidia at 34 °C). Thus confirming that NCU00478 is the gene responsible for the aconidial phenotype in the *acon-2* mutant.

Identification of acon-3

The NCU07617 gene lies within the genome region predicted by genetic mapping of *acon-3*. The *acon-3* mutant is female sterile (Matsuyama et al., 1974). The NCU07617 knockout strain was female sterile as well thus crosses between the two strains proved impossible. The sequence of NCU07617 locus from *acon-3* mutant strain revealed a transition mutation at nucleotide 820 of the predicted coding sequence, this

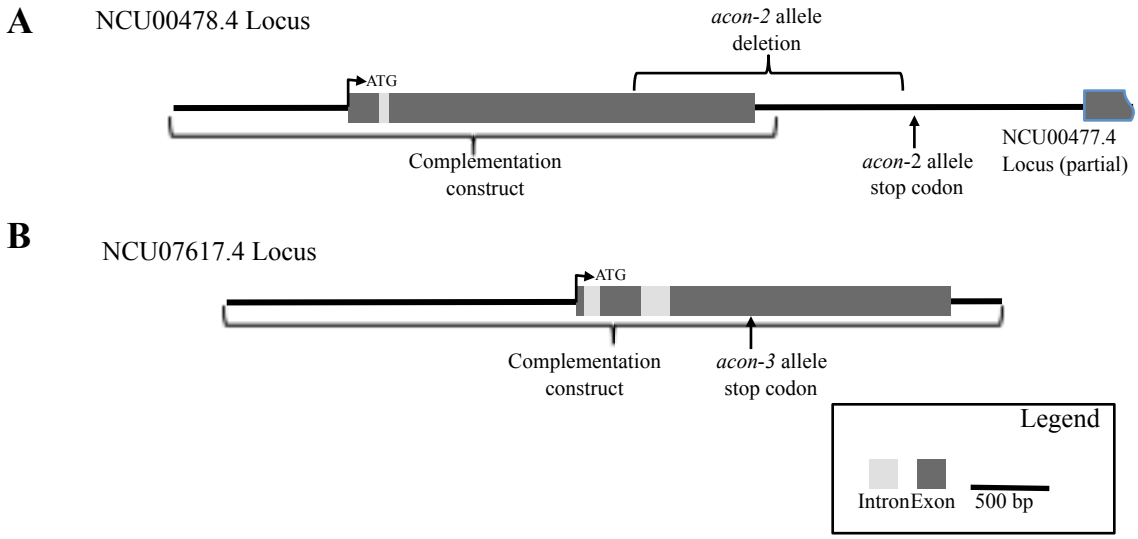

Fig. 17: Diagram of the *acon-2* and *acon-3* gene locus. Wild-type locus is shown to scale. Complementation construct and mutant alleles are noted.

changes the glutamine at amino acid 273 to a TAG stop codon, thus, prematurely terminating the 692 codon open reading frame (Appendix C, Table C1). Transformation of the *acon-3* mutant strain with a PCR generated clone containing 2 kb of DNA upstream of the coding region and 0.5 kb downstream complemented the conidiation defect but did not rescue female fertility (Fig. 17B).

Taken together with the mutations found in each of these genes in the mutant, the absence of conidial progeny with crosses in *acon-2*, as well as recovery of phenotype when complemented with the wild-type genes, we concluded that NCU00478 and NCU07617 are the genes encoding *acon-2* and *acon-3* respectively.

Discussion

The *acon-2* gene encodes a homolog of high-affinity cAMP phosphodiesterases. Orthologs of this gene in the filamentous fungi tend to be similar in size (806 to 836

amino acids) but the C-terminus is poorly conserved. In contrast, the orthologous proteins from the Saccharomycotina (yeasts) are ~600 amino acids in length and completely lack this C-terminal region. A homolog of *acon-2* was detected in the Basidiomycetous yeast, *Crypotcoccus neoformans*, and it also lacked the C-terminal region. It is worth noting that no clear homolog to *acon-2* was detected by TBLASTN analysis of other Basidiomycetes, including *Ustilago maydis*, *Coprinus cinerea*, and *Phenerochaete chrysosporium*.

Based on the poor sequence conservation of the C-terminal region, it seems unlikely this region is involved in catalysis. It is interesting that the temperature sensitive *acon-2* allele lacks this region and this finding suggests the C-terminal region may play a regulatory role in controlling ACON-2 enzymatic activity.

Since the role of the high affinity phosphodiesterase is to degrade cAMP, cells lacking ACON-2 activity should have elevated cAMP levels. cAMP signaling (Fig. 18) is known to be involved in regulating conidiation. The Gα proteins GNA-1, GNA-2, GNA-3 have all been shown to regulate the levels of cAMP through activation of CR-1, an adenylate cyclase. Their mutant phenotypes are similar to those of *cr-1*(*crisp*), with respect to aerial hyphal extension and de-repression of conidiation in liquid culture (Kays and Borkovich, 2004; Kays et al., 2000). In *N. crassa*, the adenylate cyclase (*cr-1*) mutants form conidia directly from vegetative hyphae with no aerial hyphal growth; it is also de-repressed for conidiation in liquid culture. The addition of cAMP to all of these mutants restores the wild-type conidiation phenotype. cAMP clearly plays an inhibitory role in the induction of conidiation and the role of *acon-2* fits into this model

(Fig. 18). In this regard, it is of interest to note that over-expression of the regulatory protein, FL, could induce conidiation in the wild type in minimal medium, but could not induce development in the *acon-2* mutant unless the medium lacked nitrogen. This suggests that either nitrogen serves as a second signal that bypasses the inhibitory effect of elevated cAMP in the *acon-2* mutant, or that nitrogen starvation inhibits cAMP synthesis sufficiently to allow induction of conidiation. In *S. cerevi*siae, nitrogen levels have been shown to play a role in the regulation of adenylate cyclase through the action of RAS (Tamaki, 2007) (Fig. 18B).

acon-3 is an ortholog to *A. nidulans medA* (medusa), a regulator of multicellular development. The fact that it has a conserved role in sexual and asexual sporulation suggests that it plays a key role in coordinating the cellular morphogenesis and that the timing, location, and level of expression may be critical to its function. The fact that the *acon-3* clone complemented the asexual, but not sexual development defects suggests that sequences required for appropriate expression during sexual development were lacking in the clone used for complementation, or alternatively the site of integration of the wild type copy does not allow proper expression during sexual development.
The *medA* gene is conserved across the Ascomycota and Basidiomycota; however, it is not found in *S. cerevisiae*. The transition mutation (C-T) in the *acon-3* mutant allele creates a premature stop eliminating over half the predicted amino acid sequence, thus, this region may be required for both sexual and asexual sporulation. How *medA* functions during development is not yet understood. The protein is localized to the nucleus in *A. nidulans* (Da-Woon Chung, personal communication), however, there is no

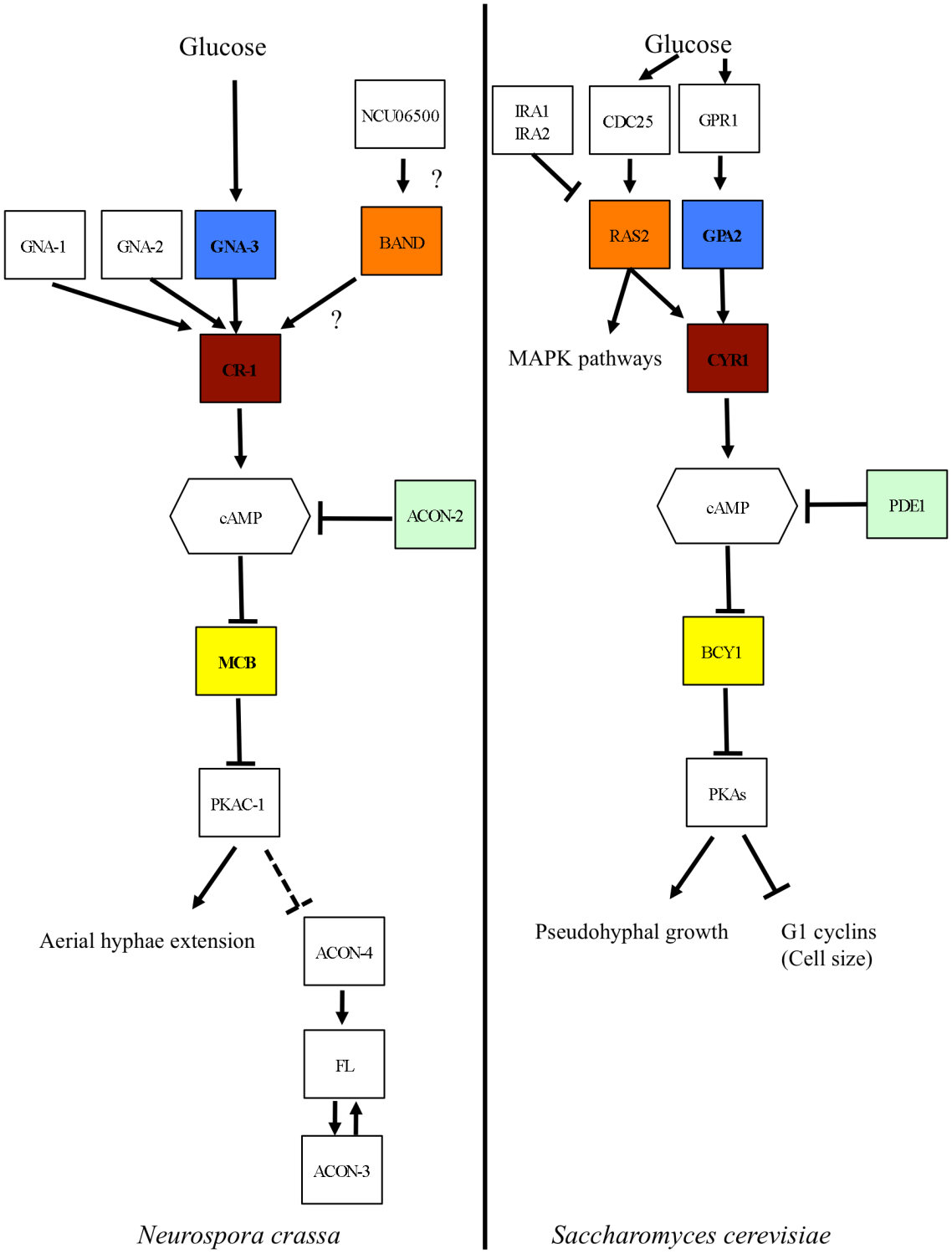

Fig. 18: Comparison of cAMP signaling pathways in *Neurospora crassa* and *Saccharomyces cerevisiae*. Squares represent proteins. Identical colors represent orthologous proteins. Orthologs identified through BLASTP in Broad Institute Fungal Genome initiative Database.

known DNA binding motif present in the protein. The gene is regulated during conidiation in *N. crassa*, but does not have a pattern of induction during development in *A. nidulans* (Da-Woon Chung, personal communication).

Identifying genes with established conidiation phenotypes and known interactions with the key regulator *fl* provides for a better understanding of the mechanisms involved in the regulation of conidiation. A*con-2*, with its role in degrading cAMP, acts as an antagonist of aerial hyphal growth and fits into the model of conidiation and aerial hyphal formation. Identification of *acon-3*, an ortholog to *A. nidulans medA*, supports a conserved role for this gene in development across the Pezizomycotina. The identification of these two genes allows for future tests of their roles in the gene network responsible for asexual development.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The development of new technologies during the course of this dissertation research has been exciting. The ever-increasing volume of sequenced genomes has made comparative analyses possible. It is also important to remember the increases in computing power. Computers can now perform computations necessary for the phylogenetic analyses described in this study in hours, while a few years ago, they would have taken weeks. Furthermore, advances in the computer processing power and storage have allowed me to analyze the terabytes of information that can easily be generated from the wealth of biological information.

I explored the evolutionary history of genes found within the loline biosynthetic cluster, *lolD* and *lolC* (Chapter II). The major finding in this portion of the dissertation was that *lolD* and *lolC* orthologs are found across a diversity of species in the filamentous fungi. Furthermore, while *lolC* and *lolD* are found clustered in *Epichloë* and *Neotyphodium* genera, there is no evidence of linkage in other fungi. While the portion our original hypothesis that *lolC* and *lolD* originated as duplicates within an endophyte ancestor was not supported, the evidence continues to support the idea that the loline biosynthetic cluster originated in a fungal ancestor, rather than through a "selfish cluster" mechanism (horizontal gene transfer event). The number of genomes sequenced since this question was first explored in Kutil (2006), allowed us to further understand the origins of *lolD* and *lolC* in the cluster.

I explored the evolutionary history of the "hub" proteins (MAPKKK, MAPKK, and MAPK) found in the MAP kinase-signaling cascade (Chapter III). I found that the MAPK gene of the cascade was the most conserved gene in the cascade, and hence was likely more central to the gene network. I also explored the evolutionary history of the cascade itself and found that three paralogous cascades existed in the ancestor of eukaryotic organisms. This ancient arrangement has been maintained (although expanded by duplication in some genera) throughout all lineages of eukaryotes today. The MAP kinase genes orthologous to the cell wall remodeling pathways in *Saccharomyces cerevisiae* are the most ancient, and the MAP kinase cascade genes in the pheromone and osmolyte pathways originated via whole cascade duplication in the ancestor eukaryotes. Again, the depth of genome sequences has allowed us to track the evolution of these pathways with confidence.

In collaboration with Dr. Takao Kasuga and Dr. Louise Glass, I characterized the differential expression genes and gene networks within the transcriptome of *N. crassa* during macroconidiation (Chapter IV). We used a whole genome microarray developed by the *N. crassa* program project (Dunlap et al., 2007). Our major finding was the observation and characterization of tissue specific differential gene expression during macroconidiation. We identified the orthologs of *Aspergillus nidulans medA* and *flbC* as being regulated during conidiation, exhibiting a higher level of expression in the aerial tissue relative to the mycelial mat during macroconiditation.

I identified the genes responsible for *acon-2* and *acon-3* aconidial mutants, NCU07617 and NCU00478 respectively in *N. crassa* (Chapter V). *acon-2* is a a cAMP

phosphodiesterase. This gene is responsible for the degradation of cAMP, which is necessary for induction of macroconidiation. In the temperature-sensitive mutant allele, there is a deletion of the C-terminal region of the protein. *acon-3* is an ortholog of *A. nidulans medA*. As opposed to being a developmental modifier in *A. nidulans*, in *N. crassa acon-3* is necessary for conidiation. In the *acon-3* allele of *N. crassa* there is a transition mutation at codon 273, which results in a premature stop codon that truncates over half of the protein. I showed that complementation with wild-type copies of both genes restored macroconiditation in the mutants. Knowing the roles for these genes in the network required for macroconditation allows further studies of other genes.

Perspectives

Much of the work in this study would have been impossible or very difficult without the advent and widespread use of very recent technologies. For instance, Matsuyama and colleagues (1974) first described *acon-2* and *acon-3* over 36 years ago. The identification of these genes in this study was facilitated by knowledge of the their roles in other species, the availability of a genome sequence, chromosomal linkage data to scan potential candidate genes, and the availability of knockouts to confirm phenotypes. The power of these biological and molecular tools cannot be overstated.

Even with the tools available at present, there is much left to do to further our understanding of model systems. In our microarray study less than one half of the genes regulated during conidiation, 1/10 of the genome, have functional annotations. Increasing the depth of this knowledge will help in understanding the role of other gene products.

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APPENDIX A

Recipes:

Electroporation Buffer

Sorbitol	182.17 grams
PEG 4000	10 grams
H_20	Add to make 1 liter, 0. 22 μm sterile filter

Vogel's Medium (Minimum):

Vogel's 50X salts	20 mL
Sucrose	15 grams
H_20	Add to make 1 liter, autoclave

50X Vogel's Salts:

$Na_3Citrate{\cdot}5H_20$	150 grams
KH_2PO_4	250 grams
NH4NO3	100 grams
$MgSO_4{\cdot}7H_20$	10 grams
$CaCl_2{\cdot}2H_20$	5 grams (dissolve in H_20 first, add slowly)
Trace Element Solution (see below)	5 mL
Biotin Solution (see below)	2.5 mL
H_20	Dissolve above in 750 mL, then add adjust to 1 L

Trace Element Solution:

Citric acid$\cdot1H_20$	5.00 grams
$ZnSO_4{\cdot}7H_20$	5.00 grams
$Fe(NH_4)_2(SO_4)_2{\cdot}7H_20$	1.00 grams
$CuSO_4{\cdot}5H_20$	0.25 grams
$MnSO_4{\cdot}H_20$	0.05 grams
H_3BO_3	0.05 grams
$Na_2MoO_4{\cdot}2H_20$	0.05 grams
H_20	Dissolve above in 95 mL H_20, then adjust to 100 mL

Biotin Solution:

Biotin	5.0 mg
H_20	Add to make 1 liter

Bottom Agar

50X Vogel's Salts	20 mL
Agar	15 g
H_20	880 mL, Autoclave
FGS additive (20% Sorbose, 0.5% Fructose, 0.5% glucose, sterile filter)	Add 100 mL after autoclave

Top Agar

50X Vogel's Salts	5 mL
Sorbitol	45.54 grams
Sorbose	5 grams
Sucrose	5 grams
0.7% LMP agarose	1.75
H_20	Add to make 250 mL, autoclave

APPENDIX B

Table B1: Primer names and 5'-3' sequences used studies of *acon-2* and *acon-3*

Primer Name	Sequence 5'-3'
NCMEDAfor1	TGTCGACCTTCTAGCACACCCAAT
NCMEDAfor2	TGACAAGGTGAAAGCACAGC
NCMEDAfor3	ACACGCTCTCTCGTTTGCTTCTCT
NCMEDArev2	ATACGGCGATGAAAGGCTCTGTGT
NCMEDAfor4	ACTTTGCTTGTTGAGACCGCCAAC
NCMEDArev3	TGTCGAACATGACGATCCTTCGCT
NCMEDArev1	AGTCGAGTCGCATCGTGATT
ACON2for1	GCCAATATCGACCAACGGCAAACA
ACON2for2	CATTGTCGCAAATATCGCCTGCCA
ACON2for3	CAAACTGCATTGCCGACACTGTGA
ACON2for4	AGCACATGGCATTTCGATGCTCAC
ACON2for5	ACACGATATCGGTGCACAGTGGAT
ACON2for6	AACGGAAACGGTCACATGAATGGC
ACON2rev1	AAGAATCCGAGAGCGTAGCATCGT
ACON2rev2	TCGCTGACGATTCGATCCGTGTAA
ACON2rev3	ACCAATGGCAGTAAGGAGAAGGGT
ACON2rev4	GTCCGCCAATGCTTGTTTCCTTGA
ACON2rev5	GTTTCTTGCCGACGCACTGAAAGT
ACON2rev6	TTGGAATGGGCAAAGAATGGGACG
NCU00477Rev	TGACAAGGAGTACGGCAAGGTCAA

Table B2: Plasmid construct descriptions. Used in complementation of *acon-2* and *acon-3*

Plasmid construct name	Description
pCG1	NCU07617.4 coding region with 2,118 bp upstream and 419 bp downstream inserted into pCB1004 at ecoR1 site in MCS
pCB2	NCU00478.4 coding region with 1,099 bp upstream and 100 bp downstream inserted into pCB1004 at ecoR1 site in MCS

APPENDIX C

Table C1: *acon-2* and *acon-3* open reading frames with predicted protein sequence.

Sequence name	Sequence
acon2 open reading frame	ATGGATATCATGGAGGAACCACAAGTTGCCATGGAGGACATCCACT ACCGTGTTATATACGTCAACCGCTCAGTATCCGAGGACCGCTGCAT CCAACGAAGCGCAAGGCATTTGGACGACACTGAGGGTGCCTGCAT GTCCCACTGGCTCCAGCCCCAAGAAGATCACGAGGCCGATCTTCAA CCAACGATTATCCTCCTAGACACCCCTTACCAGCAGTTCTTCCCGGC CCAATTTCCGwAATGAACGCAGGGACGAGAGCCACGATGGCAACT CGTACGGCCTCTCGTTACTTAAAAAGATCGAGTCCGAAGCTCGTGC TCGCCATCTCTACGAGCAGGTTATACCTGTCCCACTCATCCAATCAC CCGACGCCATGAACAACATCAGTGGGGCAGATAGGACGAGGATGC GACAACAATGTATCGATTTTGGGGCCAAGGCAGTCTTGTCGGGTCC CCTGAATGCTAAGAGCATCGCAGTGATTCAAGACAGGGCATATTAC GCTTACAAGGACGCTCTTTCAAGGAAACAAGCATTGGCGGACGTGC GTAAGGGCAGAAAACGATCACTGATCGCTGTGTTCAACGATACCCG GCCGTATGGTTATCTCCGTGAATACCTCGTGGAGAGTTTGATTAAG AAGATCTGCAGCACGGAGGACGACAGAGATAATGAGATCTATAAG GCCAATATCTCGGTATGCCCAGAGAAGCGAGCTGAAATCTCCCGTG CCATCAGCACATGGCATTTCGATGCTCACAAATTTGACTACGACGA GCTGATAGTCGCAGCCGAACTCACACTAAACCATGCCTTATCCATG CCAGAGCTAAAGGCATTTCGCATCTCGCCAACGCAGTTGCAAAATT TCCTCAAAGCTTGTCGGGCTGCTTATGTGGGTTTTGTGCCATACCAT AACTTTCGACATGTTGTCGACGTTCTACAGGCAACTTTTCAGCAGCT GCTCCGGATTGGCGCATTGCCTCCTTATCCAAACGTCAACGGTACTC ATACAAGCCCAATCGCAGAATCTCCTGGAACACCCTCCATAGGTCC GGAAGAAGCCTTCACCCTTCTCCTTACTGCCATTGGTCACGATGTTT TGCATCCCGGTGTCAACAACGGCTTTCTGATCGAGGCACGAGCGCC TCTCGCAGAGCTTTACAACGATCGCTCAGTCCTGGAGAATTTCCAC AGCACCAGCTACTGCCAGATTCTCAAGCGACATTGGCCGATCTTTT ACGAGAATAGGCGTCTGCGCACGTTGATGATCAGTTGTATCCTGGC TACGGACATGGCCCTGCATTTCGACTACATGGCAAAACTCGGAAAC TTGCAAAAACTTCAAGCTCAAAAACCTGATCTTGACGGTTGGAATG AGAAGGCTGTCGACGAGGCGAGGGTGCTAGTGTGCGCTCTTATAAT CAAGTGCGCTGACATCAGTAACGTCGCACGGAGACACGATATCGGT GCACAGTGGATGCACCTGCTGAATGACGAGCTTATATTGCAGACTC AGATTGAGATGGATATGGGTCAAAAAACGGCACTTATCGCTCCACC ATCGACGAGCCTTGACGGCCGGATCAGGTCCCAGCTAAAATTCATG GAATTGTTTGCCTTCCCTCTGTTCCGAGGCGTGGCAGATATCTTGCC CGGTCTCGACTCTATTCTGGGCTCATCCGAGGAAACAAAAGAACTC GCGAATTCTACTTCGGTTGTGTCGGTGTATTAG

Table C1 (Continued)

Sequence name	Sequence
ACON-2 predicted protein sequence	MDIMEEPQVAMEDIHYRVIYVNRSVSEDRCIQRSARHLDDTEGACMS HWLQPQEDHEADLQPTIILLDTPYQQFFPAQFPNERRDESHDGNSYGLS LLKK IESEARARHLYEQVIPVPLIQSPDAMNNISGADRTRMRQQCIDFG AKAVLSGPLNAKSIAVIQDRAYYAYKDALSRKQALADVRKGRKRSLI AVFNDTRP YGYLREYLVESLIKKICSTEDDRDNEIYKANISVCPEKRAE ISRAISTWHFDAHKFDYDELIVAAELTLNHALSMPELKAFRISPTQLQN FLKACRAAYV GFVPYHNFRHVVDVLQATFQQLLRIGALPPYPNVNGT HTSPIAESPGTPSIGPEEAFTLLLTAIGHDVLHPGVNNGFLIEARAPLAEL YNDRSVLENFHS TSYCQILKRHWPIFYENRRLRTLMISCILATDMALHF DYMAKLGNLQKLQAQKPDLDGWNEKAVDEARVLVCALIIKCADISN VARRHDIGAQWMHLLND ELILQTQIEMDMGQKTALIAPPSTSLDGRIR SQLKFMELFAFPLFRGVADILPGLDSILGSSEETKELANSTSVVSVY
acon-3 open reading frame	ATGTCGTCCCTCAAGTTCCAACAGCCTGTATACAAGGTGTACGAGC CCGGCTATCATCCGCAACGGACCATAATAGTCGACGAGCAAATCGA CTCTCCGGAGACACTGACGATTCGGCTAGAGGAAGAAGCAGCAGC ACGTAACGGTGGGGACCTCGACGGGAACTCCCCGAATGGTCTTCTG CCCATGGCTGCCTACAAGACTCACCTGCAAGGTCAATACTTACCTC AGACGAGCTCCAACATCACAGTCCTCTCTTGCCATCCCGGCACTGG AACGTACGGCACAAAGGTCGCTCTCAGAGTCTCCAGTCAATACGAT ATCCTTTCCGGGACCATGGCAGCATCGACACCCTACGTCTCCATCA GCTTTGGCTCTCAAAGATGTCCAGCGCATGTCCAGCGAGGATCTCC AGATGCGAACGGCTCCTGCATCTACGTTGTCACAGCCGATGCGCCT GAATTTCTGTCAACAGGATGCCCATCGCTCAGCAACGTGCCCCTAA CTTTGCTTGTTGAGACCGCCAACGGCAGCGAAATTGCGCGGGTACC AAACGCCGGCATGTTCTCCTATAGCGATGGTCAGGGTGGAGTTGGT AGTATTGGAGGTTCCGGTGCCGGGAGCCCGCCTGACCTGGGTAGCC CGAAAGATCGGTCACCCTCCCACCGAGCAAGCCCACCAACACACCA TGGGCTTGAGGGGGATTCGGCTACAACAACGTATGGTTTCCCTCCT GGCGTCTCGCCGACACAAGCACAGACCTACGGCCACAGCACCAAC AGCATGCTTGGGGCTTACCGAAGCGGGTCCTTCTCTGAGTAG
ACON-3 predicted protein sequence	MSSLKFQQPVYKVYEPGYHPQRTIIVDEQIDSPETLTIRLEEEAAARNG GDLDGNSPNGLLPMAAYKTHLQGQYLPQTSSNITVLSCHPGTGTYGTK VAL RVSSQYDILSGTMAASTPYVSISFGSQRCPAHVQRGSPDANGSCIY VVTADAPEFLSTGCPSLSNVPLTLLVETANGSEIARVPNAGMFSYSDGQ GGVGS IGGSGAGSPPDLGSPKDRSPSHRASPPTHHGLEGDSATTTYGFP PGVSPTQAQTYGHSTNSMLGAYRSGSFSE

APPENDIX D

Table D1: BLASTP e-values for homoloug genes to known S. cerevisiae MAP kinase components. E-values generated using NCBI nr protein database

Gene	F. graminearum	Aspergillus nidulans	Neurospora crassa	C. elegans	Mus musculus	Homo sapiens
Ssk1	2.00E-154	5.00E-159	1.00E-152	2.00E-73	3.00E-76	8.00E-77
Pkc1	2.00E-129	2.00E-134	9.00E-63	8.00E-88	3.00E-90	3.00E-91
Cdc28	3.00E-113	6.00E-88	1.00E-57	3.00E-94	5.00E-102	3.00E-107
Ste20	3.00E-88	9.00E-105	1.00E-107	1.00E-91	1.00E-99	8.00E-101
Rho1	6.00E-78	1.00E-80	4.00E-61	1.00E-48	1.00E-73	9.00E-73
Cdc42	3.00E-73	4.00E-73	7.00E-46	6.00E-84	4.00E-88	3.00E-77
Ste4	5.00E-56	5.00E-75	5.00E-54	4.00E-66	2.00E-65	1.00E-42
Ras2	3.00E-60	3.00E-62	4.00E-49	3.00E-53	4.00E-54	5.00E-54
Gpa1	1.00E-72	5.00E-72	4.00E-72	4.00E-68	4.00E-68	4.00E-68
Cdc24	4.00E-45	3.00E-38	9.00E-41	8.00E-11	5.00E-21	7.00E-20
Sln1	7.00E-103	8.00E-56	1.00E-102	NA	NA	NA
Ste12	1.00E-60	1.00E-60	5.00E-60	NA	NA	NA
Swi6	3.00E-51	2.00E-35	2.00E-44	NA	NA	NA
Bni1	6.00E-49	1.00E-44	4.00E-53	NA	NA	NA
Bem1	8.00E-63	9.00E-55	3.00E-59	NA	NA	NA
Fks1	0	0	0	NA	NA	NA
Dig1	NA	NA	NA	NA	NA	NA
Dig2	NA	NA	NA	NA	NA	NA
Mid2	NA	NA	NA	NA	NA	NA
Mcm1	NA	NA	NA	NA	NA	NA
Msn2	NA	NA	NA	NA	NA	NA
Msn4	NA	NA	NA	NA	NA	NA
Rlm1	NA	NA	NA	NA	NA	NA
Sho1	NA	NA	NA	NA	NA	NA
Sst2	NA	NA	NA	NA	NA	NA
Ste18	NA	NA	NA	NA	NA	NA
Ste50	NA	NA	NA	NA	NA	NA
Swi4	NA	NA	NA	NA	NA	NA
Wsc1	NA	NA	NA	NA	NA	NA
Wsc2	NA	NA	NA	NA	NA	NA
Wsc3	NA	NA	NA	NA	NA	NA
Ypd1	NA	NA	NA	NA	NA	NA
Ste2	NA	NA	NA	NA	NA	NA
Ste3	NA	NA	NA	NA	NA	NA

Table D2: BLASTP e-values for homologous gens to known S. cerevisiae MAP kinase components**.**

Name	Sequence ID, Description	Species	Accession Database
Fus2 orthologs			
mapk1_sc	YBL016W	*S. cerevisiae*	SGD
mapk1_bc	BC1G_13966.1	*B. cinerea*	broad
mapk1_cg	CHG00440.1	*C. globosum*	broad
mapk1_fg	FG06385	*F. graminearum*	broad
mapk1_mg	MG09565.4	*M. grisea*	broad
mapk1_nc	NCU02393.2	*N. crassa*	broad
mapk1_ss	SS1G_11866.1	*S. sclerotiorum*	broad
mapk1_um	UM03305.1	*U. maydis*	broad
mapk1_an	AN3719.2	*A. nidulans*	broad
mapk1_af	Afu6g12820	*A. fumigatus*	broad
mapk1_cn	50257967	*C. neoformans*	Genbank
Slt2 orthologs			
mapk2_sc	YHR030C	*S. cerevisiae*	SGD
mapk2_bc	BC1G_07144.1	*B. cinerea*	broad
mapk2_cg	CHG06954.1	*C. globosum*	broad
mapk2_fg	FG10313.1	*F. graminearum*	broad
mapk2_mg	MG04943.4	*M. grisea*	broad
mapk2_nc	NCU09842.2	*N. crassa*	broad
mapk2_ss	SS1G_05445.1	*S. sclerotiorum*	broad
mapk2_um	UM00421.1	*U. maydis*	broad
mapk2_an	AAD24428.1	*A. nidulans*	Genbank
mapk2_af	Afu4g13720	*A. fumigatus*	broad
mapk2_cn	AAO61669.1	*C. neoformans*	Genbank
Hog1 orthologs			
mapk3_sc	YLR113W	*S. cerevisiae*	SGD
mapk3_bc	BC1G_03001.1	*B. cinerea*	broad
mapk3_cg	CHG03814.1	*C. globosum*	broad
mapk3_fg	FG09612.1	*F. graminearum*	broad
mapk3_mg	MG01822.4	*M. grisea*	broad
mapk3_nc	NCU07024.2	*N. crassa*	broad
mapk3_ss	SS1G_07590.1	*S. sclerotiorum*	broad
mapk3_um	UM02357.1	*U. maydis*	broad
mapk3_an	AAD24428.1	*A. nidulans*	broad
mapk3_af	Afu1g12940	*A. fumigatus*	broad
mapk3_cn	AAM26267.1	*C. neoformans*	Genbank
Ste 7 orthologs			
mapkk1_sc	YDL159W	*S. cerevisiae*	SGD
mapkk1_bc	BC1G_03809.1	*B. cinerea*	broad

Table D2 (Continued)

Name	Sequence ID, Description	Species	Accession Database
mapkk1_cg	CHG00531.1	*C. globosum*	broad
mapkk1_fg	FG09903.1	*F. graminearum*	broad
mapkk1_mg	MG00800.4	*M. grisea*	broad
mapkk1_nc	NCU04612.2	*N. crassa*	broad
mapkk1_ss	SS1G_10792.1	*S. sclerotiorum*	broad
mapkk1_um	UM01514.1	*U. maydis*	broad
mapkk1_an	AAD24428.1	*A. nidulans*	broad
mapkk2_af	Afu1g05800	*A. fumigatus*	broad
mapkk2_cn	CNE01930	*C. neoformans*	Genbank
Pbs2 orthologs			
mapkk3_sc	YJL128C	*S. cerevisiae*	SGD
mapkk3_bc	BC1G_07633.1	*B. cinerea*	broad
mapkk3_cg	CHG06190.1	*C. globosum*	broad
mapkk3_fg	FG08691.1	*F. graminearum*	broad
mapkk3_mg	MG10268.4	*M. grisea*	broad
mapkk3_nc	NCU00587.2	*N. crassa*	broad
mapkk3_ss	SS1G_14143.1	*S. sclerotiorum*	broad
mapkk3_um	UM06342.1	*U. maydis*	broad
mapkk3_an	AAD24428.1	*A. nidulans*	broad
mapkk3_af	Afu1g15950	*A. fumigatus*	broad
mapkk3_cn	CNA07470	*C. neoformans*	Genbank
Ste11 orthologs			
mapkkk1_sc	YLR362W	*S. cerevisiae*	SGD
mapkkk1_bc	BC1G_06557.1	*B. cinerea*	broad
mapkkk1_cg	CHG03309.1	*C. globosum*	broad
mapkkk1_fg	FG05484.1	*F. graminearum*	broad
mapkkk1_mg	MG06339.4	*M. grisea*	broad
mapkkk1_nc	NCU06182.2	*N. crassa*	broad
mapkkk1_ss	SS1G_00606.1	*S. sclerotiorum*	broad
mapkkk1_um	UM04258.1	*U. maydis*	broad
mapkkk1_an	AAD24428.1	*A. nidulans*	broad
mapkkk1_af	Afu5g06420	*A. fumigatus*	broad
mapkkk1_cn	CND05760	*C. neoformans*	Genbank
Bck1 orthologs			
mapkkk2_sc	YJL095W	*S. cerevisiae*	SGD
mapkkk2_bc	BC1G_11345.1	*B. cinerea*	broad
mapkkk2_cg	CHG09618.1	*C. globosum*	broad
mapkkk2_fg	FG06326.1	*F. graminearum*	broad
mapkkk2_mg	MG00883.4	*M. grisea*	broad
mapkkk2_nc	NCU02234.2	*N. crassa*	broad

Table D2 (Continued)

Name	Sequence ID, Description	Species	Accession Database
mapkkk2_ss	SS1G_10983.1	*S. sclerotiorum*	broad
mapkkk2_um	UM01662.1	*U. maydis*	broad
mapkkk2_an	AAD24428.1	*A. nidulans*	broad
mapkkk2_af	Afu3g11080	*A. fumigatus*	broad
mapkkk2_cn	CNJ01850	*C. neoformans*	Genbank
Ssk2 orthologs			
mapkkk3_sc	YNR031C	*S. cerevisiae*	SGD
mapkkk3_bc	BC1G_04606.1	*B. cinerea*	broad
mapkkk3_cg	CHG00809.1	*C. globosum*	broad
mapkkk3_fg	FG00408.1	*F. graminearum*	broad
mapkkk3_mg	MG00183.4	*M. grisea*	broad
mapkkk3_nc	NCU03071.2	*N. crassa*	broad
mapkkk3_ss	SS1G_06598.1	*S. sclerotiorum*	broad
mapkkk3_um	UM01544.1	*U. maydis*	broad
mapkkk3_an	AAD24428.1	*A. nidulans*	broad
mapkkk3_af	Afu1g10940	*A. fumigatus*	broad
mapkkk3_cn	CND06250	*C. neoformans*	Genbank

APPENDIX E

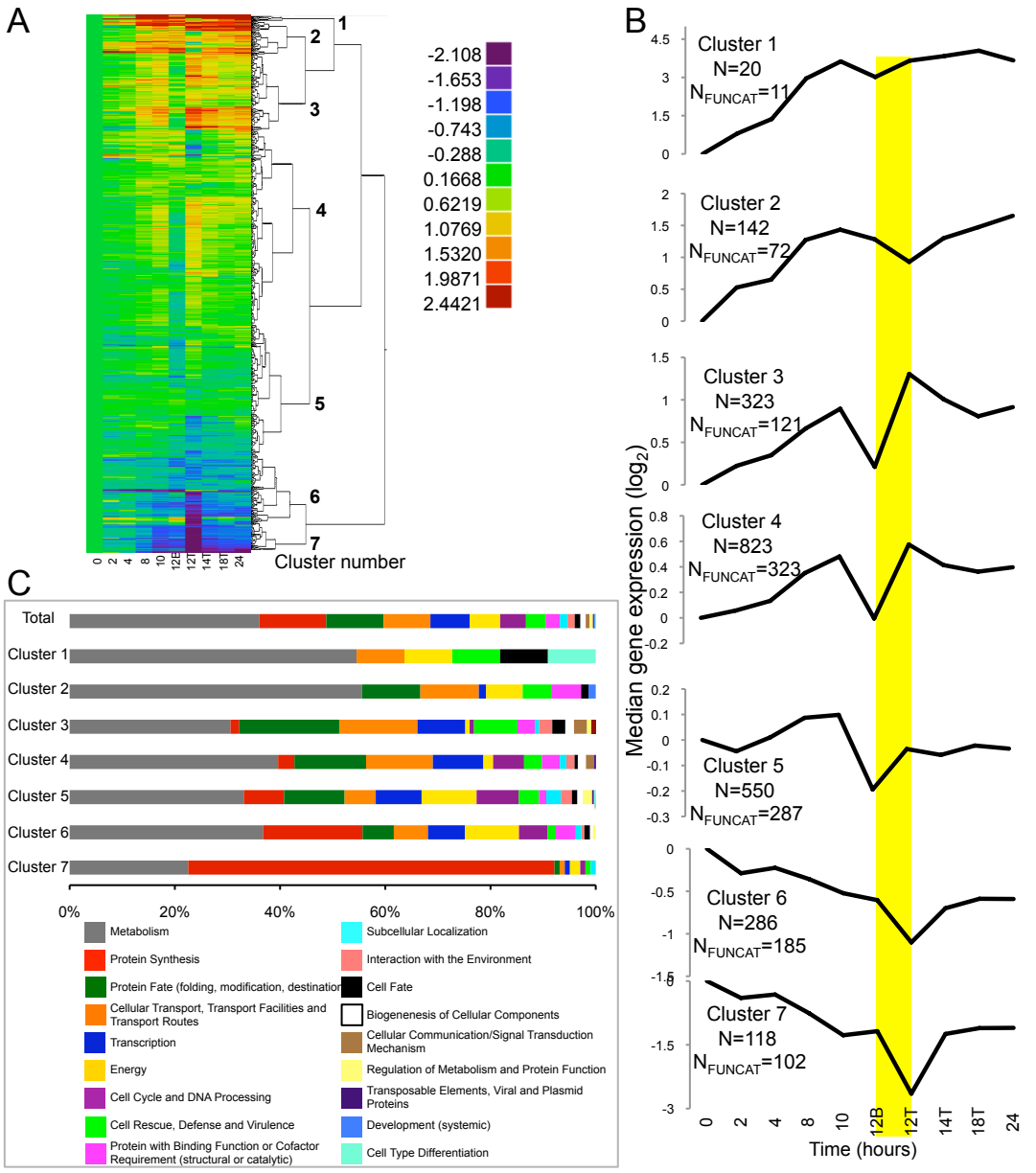

Figure E1: Expression profiles for significantly regulated genes and FUNCAT category distributions. 2A: The 2262 genes identified as significantly regulated based on non-overlapping confidence intervals in a BAGEL analysis. A one-way cluster analysis with corresponding heat map is shown. The numbers adjacent to the nodes indicate the 7 major cluster of expression identified. The expression profiles are normalized to time zero and log transformed. Thus, all data represent either an increase or decrease of gene expression relative to time zero. 2B: The graphs represent the median gene expression profile for genes in that cluster. The yellow box represents the expression levels of genes at 12 hours in the mycelial pad (12B) and the aerial hyphae (12T). 2C: A total of 1101 genes classified according to their major FUNCAT listing. The bar graphs represent the percentage of each category for the total number of genes and for each cluster.

Table E1: Relative Expression levels of all genes identified by BAGEL as significant.

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
NCU00001.1_63	NCU00001.1	1.79	3.55	3.82	3.21	2.93	1.60	1.00	1.64	1.66	1.43
3nc400_050_2077	NCU00007.1	1.27	1.12	1.14	1.37	1.61	1.00	2.28	1.74	1.44	1.47
3nc400_060_993	NCU00008.1	1.01	1.08	1.14	1.76	1.76	1.00	1.65	1.46	1.47	1.58
3nc400_070_13	NCU00009.1	1.03	1.22	1.22	1.12	1.36	1.00	2.64	2.06	2.32	2.27
3nc400_080_3027	NCU00010.1	1.00	1.08	1.25	1.22	1.43	1.10	2.52	1.59	1.57	1.70
3nc400_140_1899	NCU00018.1	1.21	1.00	1.23	1.53	1.51	1.21	1.59	1.17	1.20	1.54
3nc400_160_3196	NCU00021.1	1.36	1.13	1.09	1.00						
3nc400_170_2293	NCU00022.1	1.23	1.17	1.18	1.44	1.76	1.00	2.52	1.88	1.89	1.74
3nc400_200_887	NCU00025.1	1.00	1.06	1.10	1.08	1.19	1.16	1.33	1.22	1.18	1.19
3nc400_280_171	NCU00033.1	1.07	1.21	1.25	1.15	1.17	1.00	2.70	2.45	1.05	1.13
3nc400_290_51	NCU00034.1	1.00	1.06	1.11	1.58	2.02	1.04	2.77	2.10	2.01	2.20
3nc400_350_2309	NCU00040.1	1.80	1.53	1.84	1.44	1.22	1.23	1.17	1.42	1.00	1.06
3nc400_360_161	NCU00041.1	1.56	1.70	1.78	1.88	2.82	1.23	1.18	1.00	1.25	1.57
3nc400_380_105	NCU00043.1	1.64	1.37	1.54	2.13	1.56	1.34	1.27	1.01	1.00	1.46
3nc400_400_2349	NCU00046.1	1.00	1.22	1.51	1.76	1.97	1.57	1.16	1.09	1.27	2.04
NCU00048.1_141	NCU00048.1	1.09	1.17	1.18	1.42	1.88	1.00	2.69	2.16	1.82	1.86
3nc400_410_940	NCU00050.1	1.31	1.53	1.50	1.70	1.24	1.01	1.07	1.03	1.03	1.00
3nc400_420_203	NCU00051.1	1.28	1.35	1.45	1.56	1.37	1.00	1.12	1.10	1.05	1.11
3nc407_030_448	NCU00057.1	1.13	1.11	1.23	1.56	1.89	1.00	2.57	1.85	1.77	1.84
3nc407_050_3238	NCU00058.1	1.52	1.41	1.30	1.32	1.33	1.00	1.37	1.37	1.16	1.74
3nc407_060_2268	NCU00059.1						1.07	1.00	1.12	1.12	1.13
3nc415_070_19	NCU00067.1	1.00	1.19	1.27	1.69	1.72	1.25	1.50	1.64	1.38	1.72
3nc415_130_1049	NCU00072.1	1.07	1.00	1.21	1.33	1.26	1.30	1.68	1.62	1.54	1.56
3nc415_150_103	NCU00074.1	1.24	1.18	1.25	1.42	1.83	1.00	2.19	1.77	1.80	1.89
3nc415_210_934	NCU00080.1	1.00	1.14	1.80	2.56	2.32	2.54	3.65	3.32	3.27	3.22
3nc420_010_1546	NCU00084.1	1.08	1.13	1.15	1.45	1.60	1.00	1.54	1.57	1.50	1.59
3nc420_070_1118	NCU00090.1	1.45	1.00	1.04	1.49	1.69	1.18	2.64	1.79	1.96	2.04
3nc420_090_541	NCU00092.1	1.04	1.26	1.00	1.63	2.39	1.12	1.37	1.57	1.65	1.77
3nc420_180_829	NCU00102.1	1.42	1.00	1.14	1.19						
3nc420_270_302	NCU00111.1	1.29	1.00	1.18	2.21	2.38	1.19	3.54	2.27	1.89	2.14
3nc420_440_849	NCU00127.1	1.00	1.25	1.42	1.54	1.79	1.52	3.34	2.01	2.10	2.20
3nc425_090_658	NCU00135.1	1.51	1.36	1.29	1.36	2.24	1.00	1.90	1.39	1.31	1.24
3nc425_110_200	NCU00137.1	1.46	1.59	1.92	1.58	1.40	1.17	1.00	1.65	1.53	1.66
3nc425_150_1405	NCU00144.1	1.89	1.98	1.86	2.01	1.75	2.13	1.00	1.68	1.88	1.57
3nc430_080_3836	NCU00152.1	1.35	1.02	1.00	1.26	1.63	1.13	2.37	1.11	1.09	1.30
3nc430_150_43	NCU00160.1	1.17	1.00	1.16	1.65						
3nc430_180_1303	NCU00163.1	1.01	1.16	1.26	1.72	2.06	1.00	2.19	2.37	1.86	1.83
3nc430_220_139	NCU00166.1	1.02	1.21	1.17	1.47	1.71	1.33	1.00	1.35	1.76	1.70
3nc430_240_260	NCU00168.1	1.23	1.15	1.28	1.52	1.95	1.00	2.97	1.73	1.75	1.56
3nc435_060_488	NCU00175.1						1.62	1.00	2.30	4.99	6.35
3nc435_160_499	NCU00186.1						1.19	1.00	1.10	1.11	1.01
3nc435_210_959	NCU00193.1	1.04	1.00	1.08	1.49	1.88	1.12	3.54	2.24	2.27	2.04
3nc440_010_29	NCU00198.1	1.32	1.03	1.21	1.39	1.33	1.00	2.36	2.51	2.47	2.69
3nc440_020_5202	NCU00199.1	1.16	1.11	1.15	1.39	1.74	1.00	1.71	1.46	1.27	1.37
3nc440_060_925	NCU00203.1	1.00	1.23	1.37	1.62						
3nc440_130_28	NCU00211.1	1.37	1.26	1.07	1.00						
3nc440_190_603	NCU00216.1	1.17	1.00	1.07	1.03						
3nc440_270_600	NCU00223.1	1.05	1.14	1.36	1.50	1.55	1.00	1.51	1.48	1.30	1.34
3nc440_290_323	NCU00225.1	4.79	3.47	3.31	2.24	1.87	2.00	1.00	1.91	2.07	2.30
3nc440_320_1595	NCU00230.1	1.08	1.00	1.17	1.23	1.34	1.23	1.24	1.37	1.48	1.58
3nc440_420_5668	NCU00239.1	1.12	1.00	1.04	1.16	1.37	1.17	1.73	1.42	1.45	1.50
3nc440_460_535	NCU00243.1	1.29	1.09	1.44	1.55	1.61	1.27	1.06	1.00	1.10	1.31
3nc440_500_304	NCU00247.1	1.79	1.49	1.72	1.78	3.19	1.00	3.11	2.17	2.18	2.38
3nc440_520_1961	NCU00249.1	1.04	1.01	1.00	1.65						
3nc440_530_138	NCU00250.1	1.00	1.04	1.02	1.11	1.15	1.20	1.27	1.58	1.52	1.67
3nc440_580_453	NCU00255.1	1.01	1.28	1.14	1.27	2.25	1.00	2.22	3.33	2.21	2.26
3nc440_610_535	NCU00258.1	3.65	2.74	2.74	2.38	1.71	1.87	1.00	1.74	1.96	1.97
3nc440_640_1465	NCU00261.1	1.76	1.48	1.38	1.21	1.35	1.00	1.51	1.63	1.52	1.68
3nc440_680_738	NCU00265.1	1.00	1.26	2.17	4.00	2.43	1.19	2.16	2.02	1.44	1.26
3nc440_720_1889	NCU00269.1	1.18	1.12	1.36	1.65	1.67	1.00	1.72	1.35	1.44	1.48
3nc440_730_1040	NCU00270.1						1.20	1.00	1.00	1.01	1.05
3nc442_040_1832	NCU00290.1	1.00	1.41	1.28	2.05	2.28	2.21	1.66	2.23	3.11	2.79
3nc442_080_449	NCU00294.1	4.77	3.78	4.08	2.82	1.85	2.47	1.00	2.28	2.57	2.65
3nc442_210_840	NCU00306.1	1.16	1.12	1.20	1.31	1.51	1.00	2.07	1.40	1.50	1.52
3nc442_220_125	NCU00307.1	1.01	1.03	1.11	1.23	1.33	1.00	1.74	1.54	1.35	1.46
3nc442_240_1377	NCU00309.1	2.58	1.79	1.17	1.00						
3nc442_250_3061	NCU00310.1	1.00	1.17	1.30	1.95	2.88	1.03	4.34	2.94	2.66	2.46
3nc442_310_6	NCU00315.1	4.89	3.90	4.00	3.45	2.26	2.69	1.00	2.36	2.46	2.59
3nc442_390_272	NCU00322.1	1.53	1.00	1.00	1.66	1.52	1.29	3.70	3.38	3.32	5.56
3nc442_420_748	NCU00326.1	1.20	1.00	1.30	1.70	1.72	1.63	2.09	2.86	2.57	2.63
3nc442_460_1955	NCU00331.1	1.29	1.30	1.20	1.56	1.66	1.00	1.79	1.69	1.58	1.55
3nc442_470_1216	NCU00332.1	1.00	1.91	1.80	2.12	2.97	2.62	2.93	1.96	2.26	2.99
3nc442_610_247	NCU00348.1	1.09	1.00	1.17	1.48	1.29	1.06	1.88	2.84	1.32	1.58

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
3nc442_630_655	NCU00350.1	1.17		1.16	1.00	1.37	1.29	1.62	1.53	1.81	1.48	1.66
NCU00354.1_2	NCU00354.1	1.08		1.33	1.35	1.58	1.99	1.00	2.68	1.87	1.81	1.76
3nc442_680_258	NCU00356.1	1.00		1.18	1.21	1.47						
3nc442_720_793	NCU00360.1	1.04		1.13	1.00	1.06	1.01	1.04	2.09	1.90	1.71	1.67
3nc442_750_2206	NCU00363.1	1.00		1.08	1.06	1.09	1.87	1.52	1.40	1.31	1.59	1.32
3nc450_010_1115	NCU00366.1	1.87		1.14	1.11	1.05	1.16	1.00	1.85	1.32	1.48	1.77
3nc450_030_1866	NCU00368.1	1.00		1.15	1.17	1.49	2.21	1.05	3.39	2.22	2.13	2.06
3nc450_040_331	NCU00369.1	1.17		1.22	1.22	1.18	1.21	1.09	1.00	1.18	1.22	1.29
3nc450_110_30	NCU00376.1	1.20		1.22	1.31	1.52	1.62	1.00	1.66	1.44	1.40	1.34
3nc450_150_856	NCU00380.1	1.16		1.16	1.13	1.60	1.99	1.00	1.98	1.89	1.78	1.70
3nc450_170_118	NCU00381.1	1.15		1.07	1.33	1.56	1.61	1.07	1.45	1.18	1.00	1.26
3nc450_190_127	NCU00384.1	1.06		1.12	1.31	1.70	2.01	1.00	2.77	1.85	1.84	1.79
3nc450_260_5	NCU00391.1	1.18		1.15	1.23	1.32	1.46	1.00	1.43	1.13	1.15	1.08
3nc450_330_55	NCU00397.1	1.52		1.88	2.35	2.48	2.56	3.06	1.00	1.57	1.76	1.59
3nc450_350_109	NCU00399.1	4.29		2.05	1.13	1.00	1.89	1.64	2.18	2.63	2.87	2.53
3nc450_400_1798	NCU00405.1	6.77		4.44	5.35	4.77	4.73	10.09	1.00	4.14	5.01	2.53
3nc450_410_656	NCU00406.1	1.44		1.28	1.52	1.58	1.37	1.02	3.79	4.03	1.00	1.45
3nc450_490_695	NCU00413.1	6.62		4.11	4.13	3.17	2.21	2.83	1.00	2.57	3.11	3.10
3nc450_500_966	NCU00414.1	1.78		1.47	1.61	1.58	1.43	1.34	1.00	1.26	1.21	1.29
3nc450_540_206	NCU00418.1	1.54		1.06	1.38	1.77	1.48	1.51	1.00	1.11	1.19	1.43
b13b7_120_3841	NCU00432.1	1.44		1.70	1.83	1.66	1.77	1.58	1.06	1.00	1.30	1.43
NCU00433.1_20	NCU00433.1	1.31		1.36	1.30	1.44	1.58	1.11	1.03	1.00	1.00	1.09
b13b7_050_754	NCU00441.1	1.00		1.25	1.35	1.42						
b13b7_020_460	NCU00443.1	2.08		1.68	2.01	2.29	1.91	2.06	1.00	1.62	1.68	2.10
b2c16_280_0	NCU00449.1	1.00		1.50	1.47	1.71						
b2c16_250_2049	NCU00453.1	1.36		1.18	1.14	1.16	1.02	1.00	1.14	1.35	1.27	1.17
b2c16_240_1616	NCU00454.1	1.00		1.05	1.07	1.09	1.36	1.46	1.36	1.23	1.26	1.16
b2c16_180_2999	NCU00454.1	1.49		1.00	1.14	3.47	3.84	3.41	3.44	2.32	3.08	8.09
b2c16_210_202	NCU00457.1	1.42		1.42	1.47	1.86	2.01	1.00	2.21	1.79	1.69	1.54
b2c16_150_61	NCU00457.1	8.01		5.99	6.02	4.52	2.69	3.34	1.00	2.82	3.61	3.21
b2c16_110_1265	NCU00462.1	1.20		1.04	1.00	1.01						
b2c16_070_645	NCU00466.1	1.22		1.15	1.14	1.15	1.37	1.00	1.81	1.47	1.50	1.40
b2c16_060_628	NCU00467.1	1.00		1.12	1.13	1.27	1.48	1.01	1.19	1.23	1.31	1.16
b2c16_040_234	NCU00469.1	4.92		3.74	4.00	2.99	2.19	2.80	1.00	2.52	2.53	2.74
b2c16_020_1047	NCU00471.1	1.18		1.00	1.51	2.90	3.58	1.36	5.04	2.58	2.61	4.01
3nc460_060_162	NCU00485.1	1.00		1.31	1.49	1.69						
3nc460_110_3	NCU00489.1	8.02		6.48	7.38	4.60	3.09	2.99	1.00	2.80	3.31	3.02
3nc460_140_2309	NCU00492.1	1.05		1.11	1.19	1.52	1.96	1.00	2.37	1.93	1.60	1.49
1nc600_010_1626	NCU00499.1	1.00		1.63	1.65	2.29	2.97	3.93	2.21	2.35	2.68	4.66
1nc600_040_296	NCU00502.1	2.68		2.17	2.13	1.93	1.71	1.78	1.00	1.69	1.59	1.57
1nc600_070_145	NCU00505.1	1.02		1.01	1.09	1.66	1.65	1.00	1.69	1.60	1.86	1.58
NCU00507.1_49	NCU00507.1	1.00		1.68	1.72	2.12	2.58	1.31	3.49	2.76	1.86	1.85
1nc600_140_121	NCU00516.1	1.00		1.18	1.36	1.71	1.77	1.31	2.47	3.14	1.05	1.27
NCU00518.1_945	NCU00518.1	1.00		1.15	1.33	1.24	1.18	1.22	1.41	1.01	1.36	1.65
1nc596_010_319	NCU00519.1	1.74		1.00	1.83	2.76						
1nc596_030_235	NCU00521.1	1.14		1.19	1.24	1.48	1.94	1.00	2.23	1.78	1.64	1.57
1nc594_010_691	NCU00525.1	1.12		1.23	1.27	1.45	1.66	1.00	1.87	1.43	1.39	1.39
1nc594_020_902	NCU00526.1	1.00		1.14	1.27	1.36	1.58	1.05	1.21	1.13	1.06	1.24
1nc594_030_222	NCU00527.1	1.00		1.15	1.38	1.44						
1nc594_100_1454	NCU00536.1	1.05		1.27	1.38	1.34	1.60	1.55	1.00	1.52	1.87	1.95
1nc594_110_870	NCU00537.1	1.23		2.16	2.03	2.15	2.34	2.17	1.00	1.88	2.58	3.08
1nc594_140_190	NCU00541.1	1.45		1.88	1.75	1.70	1.66	1.36	1.00	1.22	1.25	1.34
NCU00544.1_132	NCU00544.1	1.10		2.16	2.35	2.07	1.77	1.19	1.00	1.46	1.28	1.06
1nc590_050_491	NCU00549.1	1.00		1.02	1.08	1.80	1.97	1.21	1.76	1.72	1.77	1.74
1nc590_080_1650	NCU00552.1	1.00		1.12	1.10	1.14	1.54	1.25	2.61	1.35	1.26	1.15
1nc590_100_548	NCU00554.1	2.22		1.62	2.52	2.22	2.23	2.42	1.00	1.70	1.62	1.17
1nc590_120_994	NCU00556.1	1.16		1.10	1.19	1.47	1.76	1.00	1.35	1.25	1.15	1.42
1nc590_210_1069	NCU00565.1	1.20		1.18	1.68	1.95	1.84	1.54	1.00	1.40	1.78	3.14
1nc590_220_169	NCU00566.1	1.12		1.00	1.23	1.95	1.79	1.28	1.23	1.03	1.16	1.62
b22i21_380_261	NCU00570.1	1.25		1.25	1.21	1.19	1.39	1.22	1.25	1.00	1.00	1.08
b22i21_350_1632	NCU00573.1	4.52		2.66	2.28	2.15	2.11	3.60	1.00	1.66	2.19	2.73
b22i21_340_313	NCU00574.1	1.03		1.00	1.15	1.33	1.35	1.81	1.23	1.20	1.61	1.39
b22i21_320_1130	NCU00576.1	1.31		1.23	1.24	1.62	1.88	1.00	1.64	1.37	1.30	1.49
b22i21_230_900	NCU00585.1	1.00		3.13	2.74	2.01	2.05	1.27	3.33	1.48	1.07	1.29
b22i21_220_432	NCU00586.1	1.00		1.31	1.13	1.26	1.45	1.22	3.43	5.68	3.82	4.64
b22i21_210_1730	NCU00587.1	1.15		1.07	1.21	1.31	1.47	1.00	1.48	1.44	1.28	1.28
b22i21_200_1603	NCU00589.1							1.00	2.16	2.06	1.82	2.41
b22i21_180_2127	NCU00591.1							1.00	2.11	1.25	1.60	3.59
b22i21_140_1508	NCU00595.1	1.24		1.40	1.44	1.46	1.64	1.00	1.37	1.36	1.34	1.28
b22i21_090_325	NCU00600.1	1.00		1.03	1.24	1.41						
b22i21_080_1729	NCU00602.1	1.34		1.31	1.34	1.36	1.41	1.16	1.00	1.14	1.17	1.17
NCU00613.1_69	NCU00613.1	1.18		1.11	1.12	1.00						
1nc580_080_153	NCU00618.1	4.58		4.07	4.51	3.80	2.78	3.59	1.00	3.00	3.29	3.48

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
1nc580_180_1455	NCU00627.1	2.51		1.53	1.72	1.89	1.81	2.33	1.00	1.48	2.22	3.27
1nc580_200_2260	NCU00629.1	2.33		3.23	2.73	2.16	1.78	2.54	1.00	1.84	2.06	1.89
1nc580_250_53	NCU00634.1	7.59		5.87	6.23	4.80	3.04	3.43	1.00	3.36	3.49	3.44
1nc580_260_224	NCU00635.1	2.27		1.82	2.12	2.04	1.77	1.87	1.00	1.42	1.69	1.68
1nc580_270_452	NCU00636.1	1.77		1.61	1.71	1.94	1.54	1.75	1.00	1.49	1.38	1.41
1nc580_480_71	NCU00659.1							1.00	4.44	6.49	2.89	2.73
1nc580_510_251	NCU00663.1	1.26		1.33	1.20	1.51	1.75	1.00	1.67	1.77	1.59	1.87
1nc580_580_122	NCU00670.1	1.74		1.46	1.70	2.15	1.93	1.97	1.00	1.91	1.74	2.23
1nc580_600_451	NCU00673.1	1.00		1.72	2.04	3.23	4.22	1.76	6.05	2.93	3.34	4.48
1nc580_630_92	NCU00676.1	1.31		1.32	1.51	1.45	1.68	1.00	1.68	1.53	1.35	1.25
1nc580_650_1282	NCU00677.1							1.63	1.00	1.56	1.69	1.92
1nc580_680_57	NCU00680.1	1.00		1.21	1.55	1.87	2.11	1.71	1.36	1.43	1.45	1.48
1nc580_700_672	NCU00682.1	1.00		1.57	1.43	1.33	1.38	1.35	1.35	1.27	1.22	1.37
NCU00683.1_124	NCU00683.1	1.24		1.27	1.29	1.38	1.55	1.00	2.09	1.52	1.52	1.34
1nc580_710_1209	NCU00684.1	1.26		1.34	1.08	1.00	1.03	1.07	1.07	1.12	1.12	1.23
NCU00686.1_51	NCU00686.1	1.23		1.06	1.04	1.00						
1nc580_780_1387	NCU00692.1	3.40		2.41	1.86	1.59	1.39	1.26	1.00	2.15	1.98	2.54
1nc580_800_1916	NCU00694.1	1.27		1.31	1.21	1.62	1.72	1.58	1.00	1.37	1.62	2.04
1nc580_810_1529	NCU00695.1	1.00		1.11	1.15	1.21	1.19	1.26	1.16	1.37	1.38	1.37
1nc580_820_900	NCU00696.1	1.06		1.00	1.03	1.42	1.15	1.04	1.64	1.14	1.22	1.78
1nc570_070_187	NCU00706.1	4.86		3.65	3.74	3.18	2.20	2.16	1.00	2.19	2.62	2.73
1nc570_120_1132	NCU00711.1	1.00		1.17	1.26	1.62	1.82	1.60	1.82	2.11	1.62	1.59
1nc570_130_3150	NCU00712.1	1.63		1.36	1.57	2.05	2.40	1.00	1.67	1.19	1.35	1.58
1nc570_150_1444	NCU00714.1	3.57		3.44	4.01	4.09	3.57	4.95	1.00	2.96	3.84	5.38
1nc570_170_352	NCU00716.1	1.24		4.18	2.70	2.69	1.50	2.11	1.00	1.62	3.78	3.45
1nc570_240_1263	NCU00721.1	1.07		1.20	1.24	1.48	1.47	1.51	1.00	1.42	1.94	2.75
1nc570_250_1540	NCU00722.1	1.00		1.32	1.42	1.31	1.49	1.66	1.67	2.15	2.02	2.19
1nc570_300_1424	NCU00725.1	1.00		1.18	1.42	1.78	1.91	1.21	1.39	1.36	1.74	2.63
1nc570_310_23	NCU00726.1	1.25		1.00	1.24	1.69	1.65	1.53	1.05	1.10	1.15	1.22
1nc570_340_325	NCU00729.1	1.32		1.92	1.32	1.29	1.79	1.00	2.95	1.38	1.29	1.20
1nc570_380_439	NCU00734.1	1.11		1.18	1.61	2.69	3.75	1.00	1.94	1.69	1.85	2.08
1nc570_410_403	NCU00737.1	1.09		1.00	1.07	1.06	1.37	1.16	1.42	1.35	1.29	1.47
1nc570_460_1110	NCU00742.1	1.49		1.71	1.71	2.14	2.40	2.60	1.00	1.72	1.90	2.15
1nc570_470_4622	NCU00743.1	2.44		1.00	1.20	2.30	1.96	1.65	1.45	1.09	1.25	1.62
1nc570_490_27	NCU00745.1	1.24		1.17	1.13	1.39	1.57	1.00	1.83	1.60	1.55	1.42
1nc570_500_829	NCU00746.1							1.58	1.00	1.11	1.47	1.31
1nc570_510_88	NCU00747.1	1.27		1.28	1.33	1.44	1.74	1.00	1.99	1.74	1.64	1.41
1nc570_520_126	NCU00748.1	1.04		1.54	1.71	1.44	1.97	1.00	2.37	2.02	1.81	1.94
1nc564_030_725	NCU00752.1	1.41		1.54	1.59	1.90	1.68	1.18	1.44	1.13	1.00	1.43
1nc564_050_1169	NCU00754.1	1.00		1.39	1.47	1.79	1.99	1.14	2.48	2.25	1.89	2.14
1nc564_060_1788	NCU00755.1	1.09		1.00	1.11	1.66	1.42	1.30	1.50	1.57	1.74	1.96
90c4_290_308	NCU00762.1	1.11		1.17	1.22	1.32	1.54	1.00	1.60	1.42	1.30	1.23
90c4_250_154	NCU00766.1							1.00	9.63	6.12	4.70	6.21
90c4_210_5178	NCU00770.1	1.00		1.15	1.22	1.32	1.33	1.42	1.73	1.55	1.54	1.47
90c4_190_1996	NCU00772.1	1.01		1.65	1.45	1.62	1.95	1.00	2.42	1.82	1.55	1.37
90c4_160_1002	NCU00775.1	1.88		1.84	1.93	1.67	1.60	1.44	1.00	1.21	1.30	1.27
90c4_010_2451	NCU00790.1	2.50		1.11	1.00	1.47						
1nc562_090_864	NCU00798.1	1.71		1.46	1.40	1.42	1.37	1.49	1.00	1.36	1.28	1.23
1nc560_270_700	NCU00806.1	1.22		1.26	1.32	1.48	1.63	1.00	2.02	1.64	1.59	1.55
1nc560_230_2829	NCU00810.1	1.02		1.34	1.49	1.41	1.32	1.56	1.00	1.21	1.38	1.35
1nc560_220_576	NCU00811.1	5.79		3.70	2.73	1.89	1.64	1.00	1.86	1.23	1.00	1.11
1nc560_200_1244	NCU00813.1	1.05		1.00	1.04	1.11	1.38	1.21	1.76	1.22	1.21	1.20
1nc560_190_1203	NCU00814.1	1.00		1.30	1.76	2.29	2.72	2.11	3.66	2.51	2.30	3.23
1nc560_140_1337	NCU00821.1	1.71		1.00	2.15	4.10	4.37	5.49	4.75	6.37	6.81	7.51
1nc560_010_6538	NCU00833.1	1.17		1.00	1.13	1.98	1.84	1.03	1.23	1.25	1.22	1.52
1nc557_020_350	NCU00836.1	1.00		1.23	1.31	1.33	1.95	2.23	1.93	2.60	2.26	2.45
1nc555_070_821	NCU00844.1	1.07		1.07	1.00	1.54	2.29	1.41	2.53	2.06	1.82	1.79
1nc555_080_238	NCU00845.1	1.28		1.39	1.15	1.44	1.78	1.00	1.59	1.71	1.57	1.71
1nc555_110_807	NCU00848.1	1.26		1.00	1.29	2.49	3.47	1.76	4.82	3.38	2.90	3.93
NCU00851.1_30	NCU00851.1	1.00		1.14	1.18	1.42	1.65	1.06	1.63	1.28	1.25	1.31
NCU00854.1_414	NCU00854.1	1.00		1.07	1.21	1.29	1.48	1.23	1.23	1.18	1.25	1.17
1nc550_020_311	NCU00856.1	1.00		1.03	1.10	1.22	1.47	1.30	1.35	1.35	1.32	1.33
1nc550_050_1026	NCU00860.1	1.00		1.02	1.04	1.58	1.20	1.03	1.94	1.80	1.11	1.28
1nc550_110_615	NCU00866.1	1.76		1.41	1.37	1.54	1.50	1.48	1.00	1.04	1.24	1.34
1nc550_200_627	NCU00875.1	1.11		1.12	1.17	1.43	1.27	1.00	1.94	1.48	1.11	1.41
1nc550_210_1270	NCU00876.1	1.11		1.02	1.37	1.39	1.51	1.00	1.56	1.41	1.15	1.21
1nc550_230_109	NCU00878.1	2.63		45.01	23.39	33.74	40.12	63.15	1.00	35.92	38.40	16.39
1nc550_290_790	NCU00884.1	1.03		1.00	1.17	1.74	1.85	1.49	1.84	1.84	1.92	1.72
1nc550_300_1254	NCU00885.1	1.31		1.21	1.31	1.46	1.63	1.00	1.74	1.44	1.44	1.24
1nc550_310_147	NCU00886.1	1.00		1.13	1.10	1.38						
1nc550_330_691	NCU00888.1	1.00		1.11	1.14	1.17	1.21	1.25	1.06	1.18	1.15	1.23
1nc550_370_896	NCU00891.1	1.10		1.23	1.37	1.38	1.86	2.04	1.00	1.41	1.65	2.07
b13c5_200_1732	NCU00894.1	1.52		1.16	1.29	1.12	1.17	1.19	1.08	1.07	1.00	1.17

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b13c5_180_1807	NCU00896.1	1.13		1.00	1.22	1.48					
b13c5_110_519	NCU00903.1	2.04		1.58	2.30	3.26	2.71	2.43	1.00	2.19	2.38	2.56
b13c5_090_1562	NCU00905.1	1.35		1.08	1.09	1.00	1.11	1.19	1.16	1.09	1.15	1.11
b13c5_060_940	NCU00911.1	1.90		1.42	1.56	1.68	1.04	1.29	1.35	1.00	1.59	1.51
b13c5_020_1597	NCU00915.1	9.82		25.04	17.45	14.19	13.47	29.00	1.00	8.80	14.49	7.04
b13c5_010_2415	NCU00916.1	1.00		1.02	1.01	1.53	1.70	1.10	1.90	1.54	1.41	1.43
g17b7_150_1272	NCU00918.1	1.01		1.66	1.88	1.84	1.81	1.86	1.00	1.28	1.41	1.58
g17b7_140_2189	NCU00919.1	1.54		1.29	1.35	1.17	1.06	1.01	1.00	1.10	1.27	1.29
g17b7_090_1055	NCU00923.1	1.29		1.28	1.16	1.11	1.14	1.13	1.00	1.01	1.12	1.06
g17b7_080_855	NCU00924.1							1.00	1.34	1.08	1.00	1.12
g17b7_060_2044	NCU00926.1	1.28		1.00	1.20	1.69	3.43	1.15	2.12	1.59	1.53	1.88
g17b7_020_54	NCU00930.1	1.34		1.06	1.13	1.11	1.00	1.01	2.11	1.49	1.84	2.17
g17b7_010_1187	NCU00931.1	1.34		1.24	1.32	1.56	1.90	1.00	2.50	1.80	1.46	1.59
1nc551_030_626	NCU00935.1	1.87		1.66	1.33	1.53	2.17	1.00	1.65	1.24	1.05	1.42
1nc551_060_845	NCU00938.1	1.33		1.17	1.10	1.00						
b20j13_020_528	NCU00951.1	1.17		1.09	1.57	2.00	1.77	1.69	1.00	1.24	1.20	1.30
b20j13_080_96	NCU00957.1	2.02		1.43	1.54	1.62	1.73	1.41	1.14	1.00	1.16	1.01
b20j13_090_947	NCU00958.1	1.50		1.37	1.49	1.26	1.17	1.00	1.08	1.18	1.14	1.02
b20j13_140_901	NCU00963.1	2.52		2.03	2.32	2.13	1.83	1.68	1.00	1.25	1.20	1.41
b20j13_220_389	NCU00971.1	5.23		3.91	4.07	3.59	2.41	2.93	1.00	2.83	2.72	3.26
b20j13_280_226	NCU00977.1	1.45		1.35	1.44	1.69	1.97	1.00	2.42	1.94	1.87	1.84
b20j13_300_27	NCU00979.1	6.40		4.83	5.41	4.13	2.72	2.83	1.00	3.16	3.08	3.65
b20j13_330_1001	NCU00983.1	1.06		1.00	1.02	1.20	1.33	1.02	1.57	1.26	1.26	1.29
1nc548_050_771	NCU00992.1	1.82		1.00	1.20	1.42						
1nc548_080_312	NCU00995.1	2.85		3.91	2.66	3.15	2.83	3.12	1.00	1.77	1.78	1.99
NCU00997.1_1322	NCU00997.1	1.92		2.00	1.20	1.00	1.03	1.15	1.07	1.43	1.41	1.52
NCU00999.1_197	NCU00999.1	1.57		2.25	1.96	3.20	4.76	1.00	6.88	4.03	2.55	3.01
b11o8_150_158	NCU01001.1	1.28		1.16	1.11	1.05	1.14	1.00	1.00	1.03	1.03	1.06
b11o8_140_818	NCU01002.1	1.07		1.00	1.19	1.56	1.66	1.21	1.38	1.36	1.33	1.45
b11o8_110_392	NCU01005.1	1.08		1.11	1.30	1.37	1.51	1.00	1.41	1.29	1.21	1.08
b11o8_080_203	NCU01008.1	1.22		1.01	1.00	1.01	1.04	1.10	1.46	1.70	1.84	1.65
b11o8_020_1766	NCU01014.1	1.00		1.24	1.42	1.64	1.93	1.07	2.37	1.84	1.76	1.59
1a9_240_6	NCU01017.1	1.25		1.25	1.33	1.86	2.28	1.00	3.26	2.38	2.31	2.39
1a9_200_757	NCU01021.1	1.48		1.14	1.12	1.00						
1a9_180_57	NCU01023.1	1.39		1.32	1.23	1.62	1.99	1.00	2.43	2.05	1.98	2.24
1a9_150_546	NCU01026.1	1.10		1.12	1.12	1.47	1.73	1.00	1.87	1.71	1.73	1.75
1a9_100_1336	NCU01032.1	1.47		1.65	1.41	1.77	1.94	1.00	1.97	1.80	1.93	2.41
g15g9_140_381	NCU01045.1	1.00		1.23	1.31	1.51						
g15g9_120_2791	NCU01047.1	1.04		1.18	1.46	1.53	1.87	1.00	2.77	1.80	1.75	1.54
g15g9_100_83	NCU01049.1	1.41		1.44	1.45	1.66	1.61	1.00	1.92	1.65	1.71	1.74
g15g9_090_614	NCU01050.1	1.00		1.48	1.47	2.46	2.05	2.50	1.57	2.11	2.21	3.45
g15g9_080_495	NCU01051.1	1.15		1.19	1.39	1.85	1.98	1.00	2.82	1.71	1.72	1.67
b14a6_300_255	NCU01060.1							1.00	6.80	6.73	4.89	4.27
b14a6_260_446	NCU01063.1							1.00	4.95	8.98	6.50	8.63
b14a6_210_1212	NCU01068.1	1.28		1.03	1.04	1.36	1.76	1.00	3.15	1.50	1.38	2.65
b14a6_180_292	NCU01071.1	1.04		1.36	1.27	1.32	1.40	1.00	1.61	1.36	1.42	1.16
b14a6_130_95	NCU01076.1	1.38		1.28	1.33	1.27	1.42	1.03	1.05	1.03	1.05	1.00
b14a6_120_137	NCU01077.1	1.00		1.10	1.34	1.43	1.54	1.09	1.51	1.49	1.42	1.30
b14a6_070_718	NCU01082.1	1.35		1.31	1.32	1.44	1.59	1.00	1.41	1.27	1.30	1.27
b14a6_060_1136	NCU01083.1	1.05		1.18	1.19	1.96	2.89	1.00	3.08	2.24	2.05	1.82
b14a6_030_1022	NCU01086.1	1.23		1.27	1.28	1.35	1.43	1.00	1.32	1.30	1.26	1.10
b13o8_200_1703	NCU01091.1	1.13		1.39	1.48	1.23	1.44	1.34	1.10	1.11	1.29	1.00
b13o8_180_19	NCU01092.1	1.20		1.21	1.25	1.53	1.95	1.00	2.24	1.64	1.54	1.51
b13o8_160_1247	NCU01094.1	1.45		1.43	1.48	1.41	1.49	1.00	1.65	1.49	1.46	1.28
b13o8_090_1170	NCU01100.1	1.04		1.01	1.21	1.41	1.57	1.00	1.88	1.64	1.34	1.52
b13o8_020_909	NCU01107.1	1.23		1.00	1.51	2.96	3.40	4.08	10.04	7.72	6.19	7.41
13e11_300_1099	NCU01119.1	1.00		1.06	1.01	1.04	1.15	1.48	1.24	1.12	1.17	1.28
13e11_290_778	NCU01120.1	1.00		1.01	1.21	1.53						
13e11_260_2530	NCU01122.1	1.00		1.05	1.02	1.31						
13e11_040_2357	NCU01140.1	1.00		1.67	2.25	2.64	2.55	2.36	2.37	2.62	2.36	2.48
123a4_360_145	NCU01142.1	1.62		1.36	1.28	1.82	1.68	1.46	1.00	1.21	1.21	1.52
123a4_340_930	NCU01144.1	1.08		1.23	1.27	1.06	1.15	1.30	1.10	1.14	1.17	1.00
123a4_320_290	NCU01146.1	1.29		1.22	1.69	1.98	2.14	1.00	1.73	1.09	1.23	1.68
123a4_290_211	NCU01149.1	1.00		1.02	1.25	1.52	1.60	1.19	1.57	1.22	1.11	1.20
123a4_200_1367	NCU01160.1	2.67		1.83	2.32	2.48	2.06	2.17	1.00	1.56	3.97	3.69
123a4_190_2105	NCU01161.1	1.00		1.02	1.03	1.18	1.30	1.24	1.31	1.40	1.57	1.55
123a4_120_666	NCU01166.1	1.20		1.00	1.22	1.36	1.52	1.45	2.11	1.91	2.21	2.53
123a4_080_330	NCU01169.1	1.47		1.32	1.47	1.67	1.70	1.27	1.23	1.41	1.00	1.45
123a4_060_726	NCU01171.1	1.10		1.06	1.09	1.34	1.29	1.00	1.11	1.35	1.23	1.38
123a4_050_3149	NCU01172.1	1.11		1.26	1.22	1.44	1.73	1.00	1.93	1.74	1.58	1.61
123a4_040_25	NCU01173.1	1.00		1.18	1.37	1.56	1.67	1.18	2.23	1.93	1.79	2.01
123a4_020_804	NCU01175.1	2.17		1.34	1.57	1.66	1.56	1.82	1.00	1.50	1.52	2.41

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b10h4_130_1188	NCU01181.1	1.00		9.08	5.49	5.63	5.54	8.51	1.00	5.00	6.23	4.75
b10h4_050_2725	NCU01189.1	1.53		1.48	1.54	1.81	1.89	1.71	1.00	1.02	1.15	1.84
zz30_B10H4_030_14vf	NCU01191.1	1.86		2.69	3.03	3.44	4.61	1.00	2.22	1.87	1.63	1.99
18f11_230_565	NCU01195.1	4.62		5.37	4.05	3.62	2.30	2.34	1.00	1.94	1.66	1.33
18f11_210_55	NCU01196.1	1.00		2.09	2.04	2.74	2.53	1.06	4.10	2.29	2.35	2.91
18f11_200_3966	NCU01197.1	1.47		1.00	1.21	1.42	1.40	1.43	1.10	1.08	1.13	1.66
18f11_170_550	NCU01200.1	2.33		1.76	2.43	2.92	1.85	1.87	1.00	1.55	2.10	2.32
18f11_160_127	NCU01201.1	1.05		1.02	1.05	1.23	1.47	1.00	1.66	1.63	1.21	1.35
18f11_130_194	NCU01204.1	1.31		1.00	1.33	1.77	1.69	1.42	1.10	1.11	1.24	1.56
18f11_070_522	NCU01209.1	1.32		1.37	1.35	1.57	1.99	1.00	2.77	2.03	2.03	2.09
18f11_060_1695	NCU01210.1	1.15		1.17	1.49	1.77	1.76	1.00	1.85	1.48	1.43	1.59
18f11_040_83	NCU01212.1	1.21		1.15	1.20	1.55	1.64	1.00	2.55	1.88	1.91	1.98
8d4_230_820	NCU01218.1	1.37		1.17	1.28	1.55	1.89	1.39	1.00	1.28	1.18	1.55
8d4_220_2	NCU01219.1	1.38		1.00	1.46	2.21	2.02	1.86	1.20	2.78	2.76	3.10
8d4_210_803	NCU01220.1	1.15		1.21	1.27	1.43	1.66	1.00	2.21	1.85	1.57	1.67
8d4_200_220	NCU01221.1	5.95		4.75	5.11	3.57	2.28	2.33	1.00	2.64	2.73	2.66
8d4_170_1310	NCU01224.1	1.00		1.21	1.08	1.46	1.47	1.07	1.71	1.14	1.40	1.52
8d4_130_369	NCU01227.1	1.98		1.85	2.21	1.93	1.60	1.19	1.00	1.19	1.34	1.17
8d4_080_1252	NCU01231.1							15.8	1.00	14.7	15.42	16.44
								3		6		
8d4_060_39	NCU01233.1	1.00		1.01	1.18	1.53	1.73	1.35	2.80	3.20	3.25	2.52
8d4_030_721	NCU01236.1	1.11		1.21	1.19	1.05	1.09	1.25	1.10	1.10	1.17	1.00
3h10_120_1375	NCU01240.1	1.49		1.00	1.02	1.25	1.43	1.45	1.16	1.17	1.20	1.34
b10n12_110_909	NCU01253.1	1.07		1.18	1.15	1.23	1.45	1.00	1.36	1.39	1.76	1.11
b10n12_070_538	NCU01257.1	1.55		1.34	1.17	1.18	1.58	1.00	2.07	1.89	1.83	1.67
b10n12_060_252	NCU01258.1	1.04		1.05	1.19	1.75	1.72	2.09	1.00	2.67	2.86	3.53
b13m13_130_1357	NCU01271.1	2.28		1.19	1.26	1.43	1.62	1.00	1.76	1.46	1.44	1.40
b13m13_050_2316	NCU01278.1	1.74		1.36	1.52	1.25	1.14	1.00	1.16	1.28	1.22	1.09
b9k17_020_3944	NCU01283.1	2.08		1.29	1.46	1.57	1.70	1.00	1.66	1.26	1.33	1.21
b9k17_070_1183	NCU01289.1	1.11		2.08	1.63	1.54	1.55	1.20	1.00	1.01	1.26	1.14
b9k17_080_584	NCU01290.1	2.07		1.62	1.86	1.70	1.43	1.37	1.00	1.18	1.29	1.24
b9k17_150_1042	NCU01295.1	3.38		4.65	5.49	3.40	2.94	3.50	1.00	2.21	2.52	1.06
b9k17_160_1	NCU01296.1	1.00		4.21	2.47	1.54						
b9k17_170_553	NCU01297.1	3.58		4.51	4.33	2.75	2.23	2.88	1.00	1.68	2.10	1.96
65e11_020_171	NCU01299.1	1.27		1.29	1.41	1.32	1.28	1.26	1.00	1.13	1.43	1.45
65e11_040_141	NCU01301.1	2.45		1.75	1.46	1.00						
65e11_090_925	NCU01306.1	2.01		1.52	1.58	1.43	1.31	1.00	1.24	1.37	1.49	1.38
65e11_130_1749	NCU01311.1	1.13		1.25	1.19	1.26	1.69	1.00	1.97	1.26	1.30	1.50
65e11_140_861	NCU01312.1	1.14		1.26	1.28	1.47	1.64	1.00	2.15	1.73	1.47	1.55
65e11_170_221	NCU01314.1	1.00		1.26	1.26	1.17	1.25	1.12	1.51	1.31	1.26	1.22
b12k8_020_32	NCU01317.1	5.58		4.48	4.81	3.48	2.35	2.49	1.00	2.56	2.91	2.59
b12k8_040_1509	NCU01319.1	1.64		1.06	1.07	1.00						
12f11_090_1980	NCU01328.1	1.77		1.00	1.48	1.76	1.44	2.30	1.17	1.70	1.82	2.19
12f11_120_204	NCU01331.1	2.59		2.46	1.67	1.51	1.12	1.12	1.00	2.20	1.87	2.37
12f11_160_3957	NCU01335.1	1.00		1.26	1.37	1.60	1.22	1.09	1.41	1.07	1.07	1.26
12f11_220_139	NCU01341.1	1.13		1.14	1.26	1.29	1.57	1.00	1.42	1.12	1.07	1.23
b13a5_050_105	NCU01348.1	1.00		2.23	2.62	2.23						
b13a5_075_54	NCU01350.1	1.02		1.00	1.00	1.03	1.04	1.05	1.13	1.27	1.33	1.49
15e6_180_81	NCU01357.1	1.00		1.32	1.36	1.59	1.49	1.36	1.77	1.73	1.24	1.77
15e6_080_3188	NCU01366.1	1.10		1.13	1.00	1.55	3.76	1.16	5.16	2.75	2.16	2.52
15e6_060_267	NCU01368.1	1.20		1.00	1.40	1.47	1.48	1.02	1.11	1.10	1.30	1.70
15e6_040_1663	NCU01369.1	2.23		1.56	1.59	1.21	1.30	1.00	1.91	1.76	1.62	1.70
15e11_090_95	NCU01381.1	1.00		1.60	1.76	2.28						
b7o17_010_1135	NCU01389.1	1.00		1.18	1.05	1.13	1.18	1.21	1.12	1.25	1.22	1.16
b7o17_040_70	NCU01393.1	1.15		1.18	1.32	1.47	1.72	1.00	1.68	1.44	1.39	1.18
NCU01400.1_2	NCU01400.1	1.32		1.29	1.35	1.62	1.61	1.00	1.74	1.51	1.59	1.28
g11a3_030_728	NCU01403.1	1.39		1.37	1.32	1.61	1.86	1.00	2.81	2.14	1.65	1.83
b8p8_190_1212	NCU01412.1	4.26		3.50	3.71	3.21	3.18	3.97	1.00	2.25	2.55	2.02
b8p8_170_1796	NCU01414.1	1.69		1.00	1.20	1.65	1.97	1.36	2.88	1.68	1.67	2.41
b8p8_100_153	NCU01418.1	7.05		6.64	5.15	3.88	3.47	5.12	1.00	2.81	3.14	3.11
b8p8_080_1038	NCU01420.1	1.52		1.00	1.07	1.23	1.15	1.28	1.31	1.64	1.51	1.67
b8p8_060_326	NCU01422.1	1.80		1.77	1.74	1.63	1.56	1.00	1.49	1.28	1.44	1.84
b8p8_040_328	NCU01424.1	1.02		1.35	1.95	3.44	2.81	2.11	1.00	1.83	2.14	1.91
b8p8_030_702	NCU01425.1	12.99		15.3	12.1	10.2	9.14	17.6	1.00	7.06	13.33	9.11
				5	7	6		0				
b8p8_020_1143	NCU01426.1	1.00		1.55	1.45	1.68						
b8p8_010_919	NCU01427.1	1.00		1.02	1.16	3.94	13.1	2.76	20.1	5.95	6.05	7.31
							3		1			
b20d17_010_806	NCU01429.1	2.55		2.00	2.16	2.29	1.77	1.49	1.04	1.31	1.16	1.00
b20d17_110_709	NCU01438.1	5.76		4.06	4.70	3.64	2.94	3.39	1.00	1.86	2.26	2.68
b20d17_120_388	NCU01439.1	9.25		9.11	10.6	6.35	5.24	5.59	1.00	2.29	2.99	2.57
					2							
b20d17_150_159	NCU01441.1	1.77		2.29	2.40	2.30	1.97	1.66	1.00	1.21	1.28	1.39
b20d17_180_1261	NCU01443.1	2.25		2.01	2.65	2.50	1.94	3.03	1.00	1.51	1.70	1.86

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b11c21_200_44	NCU01447.1	1.06		1.00	1.11	1.48	1.55	1.29	2.11	2.35	2.39	1.83
b11c21_170_298	NCU01451.1	1.00		1.46	1.74	1.86	1.84	1.50	1.99	1.90	2.03	1.77
b11c21_160_436	NCU01452.1	6.04		4.32	4.61	3.03	2.00	2.25	1.00	1.82	2.00	2.42
zz30_B11C21_160_17cf	NCU01452.1	5.74		3.91	4.51	2.99	1.93	2.33	1.00	2.19	2.70	2.37
b11c21_080_1065	NCU01459.1	1.00		1.17	1.24	1.64	2.05	1.07	2.49	1.79	1.81	1.67
b11c21_050_82	NCU01460.1	1.00		1.01	1.05	1.04	1.06	1.11	1.73	1.26	1.15	1.08
b11e5_030_97	NCU01467.1	1.42		1.13	1.31	1.47	1.40	1.31	1.00	1.21	1.23	1.02
b11e5_040_1276	NCU01468.1	1.55		1.64	1.39	1.00						
b11e5_060_219	NCU01469.1	1.17		1.39	1.45	1.52	1.64	1.00	1.46	1.35	1.37	1.55
b11e5_070_438	NCU01470.1	1.00		1.21	1.68	2.49						
b11e5_170_1570	NCU01480.1	1.11		1.02	1.00	1.17	1.16	1.26	1.23	1.39	1.41	1.58
NCU01483.1_34	NCU01483.1	1.21		1.91	1.74	2.00	1.88	3.70	1.00	3.45	3.42	9.26
NCU01484.1_194	NCU01484.1	1.56		1.34	1.40	1.75	1.83	1.00	2.00	1.31	1.44	1.70
NCU01487.1_949	NCU01487.1	1.61		3.93	2.58	2.24	2.09	3.03	1.00	2.08	2.09	2.11
2nc570_020_275	NCU01489.1	2.18		1.00	1.12	1.19						
b7n4_020_1062	NCU01491.1	1.32		1.26	1.22	1.22	1.31	1.09	1.54	1.00	1.01	1.19
b7n4_100_2002	NCU01498.1	1.78		1.31	1.08	1.00						
b5o22_260_655	NCU01501.1	1.19		1.00	1.18	1.36	1.95	1.41	2.28	1.58	1.31	1.36
NCU01508.1_192	NCU01508.1	1.00		1.09	1.10	1.06	1.14	1.12	1.09	1.05	1.10	1.31
b5o22_140_3629	NCU01510.1	2.68		1.00	1.37	1.87	1.66	2.28	8.28	4.93	4.96	5.84
b5o22_130_530	NCU01511.1	1.75		1.85	2.05	1.64	1.37	1.47	1.00	1.41	1.56	1.50
b5o22_080_68	NCU01516.1	1.63		1.41	1.45	1.00						
b5o22_070_1811	NCU01517.1	1.00		1.00	1.57	3.28	5.01	9.29	2.43	3.94	4.35	4.10
NCU01519.1_17	NCU01519.1	1.21		1.00	1.08	1.14	1.18	1.15	1.92	1.94	1.68	1.78
b5o22_010_682	NCU01521.1	1.09		1.17	1.06	1.00	1.04	1.10	1.27	1.10	1.14	1.07
b9g16_040_2098	NCU01525.1	1.00		1.02	1.12	1.07	1.27	1.48	1.18	1.07	1.06	1.18
b9g16_070_921	NCU01528.1	6.80		16.38	11.21	10.13	9.67	18.13	1.00	14.31	9.24	4.60
b24g3_070_1107	NCU01538.1	1.00		1.45	1.23	1.20	1.59	1.25	1.28	1.17	1.23	1.18
b24g3_120_2350	NCU01542.1	1.00		2.71	1.96	1.91						
b24g3_150_107	NCU01545.1	1.00		1.38	1.42	2.76	3.33	1.57	2.78	2.05	2.29	3.46
b24g3_160_321	NCU01546.1	16.64		31.98	27.19	18.94	17.56	24.76	1.00	13.33	16.20	8.25
b24g3_190_131	NCU01548.1	1.00		1.08	1.25	1.64	1.80	1.14	1.43	1.86	1.60	2.24
b24g3_210_2237	NCU01549.1	2.00		1.60	1.55	1.60	1.42	1.00	1.48	1.74	1.69	1.83
b21o8_010_0	NCU01550.1	2.58		2.65	2.58	1.82	1.52	1.20	1.00	2.04	1.60	1.22
b21o8_030_91	NCU01552.1	5.68		4.22	4.47	3.76	2.41	2.82	1.00	2.72	2.75	2.85
b21o8_060_172	NCU01555.1	1.92		1.00	1.22	3.24	3.42	1.92	12.68	9.84	5.95	5.89
b21o8_110_69	NCU01560.1	1.35		1.00	1.04	2.05						
b2o8_430_2229	NCU01565.1	1.17		1.20	1.27	1.16	1.19	1.37	1.09	1.11	1.16	1.00
b2o8_380_1818	NCU01570.1	1.00		1.17	1.42	1.69	2.00	1.36	2.86	2.52	2.09	2.14
b2o8_350_958	NCU01573.1	1.10		1.28	1.27	1.32	1.42	1.00	1.95	1.61	1.47	1.39
b2o8_330_808	NCU01577.1	1.16		1.00	1.08	1.09						
b2o8_310_1165	NCU01580.1	1.04		1.22	1.16	1.08	1.07	1.22	1.06	1.15	1.12	1.00
b2o8_270_393	NCU01587.1	2.03		1.39	1.66	2.34	1.92	2.32	1.00	1.62	1.56	2.01
b2o8_260_1498	NCU01589.1	1.98		1.72	2.09	1.00						
b2o8_210_1167	NCU01596.1	1.00		1.07	1.25	1.73						
b2o8_200_7854	NCU01597.1	1.28		1.48	1.30	1.79	2.09	1.00	2.39	1.82	1.90	2.11
b2o8_170_174	NCU01601.1	1.53		1.18	1.87	2.40	2.17	1.36	1.00	1.30	1.71	1.99
b2o8_150_91	NCU01606.1	2.27		2.12	2.17	2.20	1.78	1.54	1.00	1.47	1.44	1.33
b2o8_140_539	NCU01607.1	1.07		1.26	1.19	1.51	1.60	1.00	1.98	1.43	1.43	1.57
b2o8_110_2440	NCU01611.1	1.19		1.00	1.12	2.89	5.56	5.58	3.67	5.58	5.81	3.12
NCU01618.1_371	NCU01618.1	1.10		1.00	1.25	1.62	2.13	1.01	2.89	1.98	1.65	2.04
NCU01628.1_234	NCU01628.1	1.00		1.11	1.37	1.53	1.93	1.13	2.79	2.28	1.69	1.84
b2o8_020_1130	NCU01629.1	1.03		1.22	1.48	1.98	1.46	1.00	1.94	2.14	1.75	1.80
b14h13_020_4440	NCU01632.1	4.00		2.70	2.99	2.32	1.91	2.20	1.00	1.14	1.67	3.11
b7k22_010_1307	NCU01633.1	1.02		3.19	2.78	2.64	2.72	5.32	1.00	1.97	2.16	1.45
zz30_B7K22_020_22cf	NCU01634.1	2.40		1.88	1.68	1.68	1.71	1.00	1.65	1.44	1.45	1.35
b7k22_030_261	NCU01635.1	2.22		1.68	1.35	1.43	1.44	1.00	1.14	1.28	1.31	1.35
zz30_B7K22_030_23cf	NCU01635.1	2.37		2.19	1.71	1.55	1.44	1.00	1.54	1.36	1.43	1.36
b13i18_030_2173	NCU01646.1	1.00		1.19	1.30	1.42	1.26	1.31	1.71	1.37	1.20	1.44
b13i18_050_1564	NCU01648.1	1.51		1.14	1.34	1.14	1.27	1.07	1.20	1.00	1.06	1.02
b13i18_100_185	NCU01653.1	1.00		1.36	1.52	1.76						
b13i18_110_2002	NCU01654.1	1.00		1.58	1.77	2.31	2.52	2.28	1.87	1.61	1.70	2.79
b13i18_120_121	NCU01655.1	1.14		1.12	1.20	1.38	1.41	1.04	1.13	1.02	1.03	1.00
b1d1_060_823	NCU01666.1	3.30		2.36	2.87	2.43	2.22	2.13	1.00	1.51	1.51	1.40
b1d1_140_91	NCU01673.1	1.16		1.28	1.27	1.54	1.85	1.00	2.17	1.71	1.63	1.45
b1d1_210_2615	NCU01680.1	3.48		2.82	2.76	2.33	2.33	1.07	2.86	1.13	1.11	1.00
NCU01681.1_154	NCU01681.1	1.00		1.74	1.38	1.54	2.31	1.16	3.37	2.44	2.15	1.99
b1d1_300_834	NCU01689.1	1.39		1.00	1.82	2.42	1.46	1.15	1.53	1.41	1.23	1.12
b1d1_330_1107	NCU01692.1	3.73		3.60	4.26	3.30	2.58	3.10	1.00	2.27	2.54	1.85
61d6_060_35	NCU01698.1	2.27		1.42	1.38	1.77	1.65	1.00	1.46	1.58	1.02	1.63
61d6_050_680	NCU01699.1	1.00		1.07	1.28	1.39						

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
61d6_030_1214	NCU01701.1	1.00		1.74	2.02	2.16	1.82	1.48	1.07	1.27	1.17	1.38
b24p11_020_1109	NCU01704.1	1.38		2.00	2.75	4.38	4.08	5.53	1.00	3.30	4.17	3.64
NCU01711.1_358	NCU01711.1	1.24		1.32	1.28	1.53	1.43	2.12	1.30	1.00	1.83	1.79
NCU01712.1_241	NCU01712.1	1.51		1.48	1.55	1.80	1.94	1.00	2.72	1.86	1.73	2.03
b24p11_150_1161	NCU01715.1	1.44		1.37	1.43	1.56	1.81	1.00	2.20	1.84	1.76	1.61
b24p11_210_812	NCU01720.1	4.59		2.73	2.06	1.00						
NCU01723.1_980	NCU01723.1	1.00		1.44	1.68	2.49						
b24h17_190_1278	NCU01731.1	1.15		1.19	1.35	1.46	1.74	1.00	1.95	1.57	1.52	1.50
b24h17_100_4	NCU01740.1	2.06		1.42	1.49	1.88	2.13	1.00	2.57	1.64	1.65	2.09
b17c10_210_893	NCU01754.1	14.59		39.95	26.67	20.69	16.75	35.28	1.00	18.34	22.20	18.46
b17c10_070_1658	NCU01767.1	1.37		1.00	1.02	1.12						
b17c10_060_2662	NCU01768.1	1.41		1.07	1.30	1.61	1.37	1.38	1.11	1.00	1.10	1.16
b17c10_050_1008	NCU01769.1	1.19		1.25	1.07	1.44	1.46	1.37	1.00	1.64	1.63	2.06
b21d9_020_1855	NCU01775.1	1.35		1.32	1.40	1.27	1.31	1.44	1.04	1.00	1.45	1.40
b21d9_030_353	NCU01776.1	7.91		6.26	6.73	5.03	3.28	3.82	1.00	3.07	3.51	3.70
b21d9_080_1369	NCU01781.1	1.00		1.26	1.27	1.35	1.71	1.38	1.52	1.41	1.42	1.70
b1k11_220_4585	NCU01789.1	1.24		1.09	1.21	1.42	1.44	1.00	1.15	1.21	1.05	1.04
zz30_B1K11_190_15cf	NCU01791.1	1.77		1.56	1.54	1.47	1.48	1.18	1.42	1.14	1.00	1.50
b1k11_100_1275	NCU01800.1	1.55		1.22	1.26	1.00						
b1k11_020_155	NCU01808.1	4.07		3.05	2.34	1.36	1.29	1.00	3.24	2.15	1.58	1.56
b8b8_110_2258	NCU01813.1	1.18		1.00	1.41	2.33	3.95	1.51	3.36	3.37	3.03	4.58
b8b8_060_2307	NCU01817.1	1.00		1.00	1.25	1.30	1.21	1.08	1.34	1.23	1.22	1.55
2nc565_010_3079	NCU01820.1	1.44		1.00	1.41	1.72						
b23g1_190_92	NCU01827.1	6.94		5.72	5.95	4.36	2.87	3.29	1.00	2.95	2.91	2.82
b23g1_170_153	NCU01830.1	1.21		1.01	1.00	1.17	1.19	1.40	1.33	1.68	1.83	2.26
b23g1_120_132	NCU01835.1	1.00		1.48	1.24	1.49	2.01	1.32	1.69	1.37	1.22	1.63
b23g1_110_140	NCU01837.1	1.37		1.60	1.67	1.94	2.11	1.16	1.63	2.15	1.00	1.17
b23g1_100_59	NCU01838.1	1.45		1.06	1.31	1.34	1.72	1.00	1.57	1.67	3.72	1.84
b23g1_030_467	NCU01845.1	1.00		1.83	1.30	1.35						
1nc305_020_787	NCU01849.1	1.12		1.30	1.05	1.59	1.94	1.00	2.16	1.35	1.29	1.67
1nc305_060_1767	NCU01853.1	1.00		1.12	1.33	1.44	1.74	1.37	1.11	1.35	1.62	1.51
1nc307_010_1022	NCU01856.1	1.11		1.45	1.40	1.78	1.78	1.00	2.10	1.08	1.19	1.29
1nc307_020_3723	NCU01857.1	1.04		1.08	1.00	1.13	1.63	1.22	1.47	1.11	1.05	1.51
b13n4_050_1557	NCU01865.1	1.00		1.11	1.27	1.67						
b13n4_110_428	NCU01871.1	1.20		2.93	2.80	3.32	3.34	2.45	1.00	1.63	1.78	1.80
1nc310_070_388	NCU01894.1	1.88		1.32	1.43	1.00						
1nc310_130_793	NCU01900.1	1.00		1.03	1.03	1.03	1.25	1.36	1.18	1.14	1.17	1.25
1nc310_150_56	NCU01902.1	1.09		1.10	1.50	2.11	1.94	1.19	1.00	1.01	1.14	1.27
1nc310_170_455	NCU01904.1	1.00		2.30	3.35	4.02						
1nc310_180_911	NCU01905.1	1.45		2.41	2.99	4.47	3.36	3.18	1.00	2.52	2.71	3.33
NCU01909.1_99	NCU01909.1	1.00		1.51	1.61	1.80						
1nc310_230_2219	NCU01911.1	1.04		1.24	1.22	1.46	1.54	1.00	1.89	1.40	1.36	1.59
1nc310_250_1516	NCU01913.1	1.24		1.16	1.30	1.39	1.71	1.00	1.30	1.07	1.03	1.45
1nc310_290_8	NCU01918.1	1.10		1.00	1.11	1.42	1.46	1.15	1.30	1.25	1.24	1.10
1nc310_310_136	NCU01920.1	1.16		1.13	1.24	1.50	1.87	1.00	2.32	1.74	1.73	1.87
1nc310_340_611	NCU01921.1	1.00		1.10	1.29	1.44	1.34	1.28	2.49	2.83	2.15	2.00
NCU01924.1_1236	NCU01924.1	1.15		1.00	1.10	1.07	1.35	1.05	1.61	1.39	1.17	1.10
1nc315_130_1007	NCU01938.1	1.00		1.43	1.59	1.88	2.19	1.16	1.54	1.60	1.29	1.51
1nc320_010_1871	NCU01940.1	1.00		1.43	1.27	1.43	1.47	1.36	1.12	1.09	1.70	1.96
1nc320_020_163	NCU01941.1	1.31		2.23	2.22	2.68	2.36	1.89	1.00	1.30	1.62	4.39
NCU01943.1_25	NCU01943.1	1.00		1.95	1.55	1.72	2.33	1.12	3.97	2.93	1.91	2.00
1nc320_090_448	NCU01948.1	6.45		4.57	4.89	3.66	2.10	2.96	1.00	2.77	3.06	2.96
1nc320_080_135	NCU01949.1	7.10		5.23	5.77	4.13	2.67	2.86	1.00	2.68	2.76	2.81
1nc320_140_829	NCU01956.1	1.00		1.34	1.12	1.35	1.39	1.47	1.33	1.33	1.36	1.62
1nc322_010_989	NCU01959.1	1.00		1.12	1.26	1.52	1.35	1.26	1.88	1.87	1.56	1.94
b13d15_300_13	NCU01966.1	6.45		5.34	5.84	4.24	2.76	2.85	1.00	2.99	3.21	3.23
b13d15_280_1369	NCU01968.1	2.57		2.08	2.09	1.75	1.38	1.50	1.00	1.75	1.71	1.78
b13d15_260_408	NCU01970.1	1.00		1.06	1.48	3.76	4.45	5.42	2.16	4.66	6.03	5.87
b13d15_190_1308	NCU01977.1	2.69		2.57	2.36	1.52	1.46	2.54	1.00	1.68	1.72	1.36
b13d15_140_1072	NCU01982.1	1.35		1.32	1.39	1.50	1.86	1.00	2.10	1.67	1.66	1.47
b13d15_110_1463	NCU01985.1	2.50		1.96	2.51	1.71	1.22	1.67	1.00	1.70	2.14	1.59
b13d15_090_656	NCU01989.1							1.00	5.04	5.20	2.22	2.42
b13d15_060_2300	NCU01992.1	1.41		1.00	1.19	1.47						
b15b3_020_1417	NCU01999.1	1.27		1.19	1.35	1.53	1.80	1.00	2.15	1.75	1.65	1.53
b15b3_060_1135	NCU02003.1	4.01		3.41	4.13	2.99	2.31	3.99	1.00	2.50	2.67	2.78
b15b3_090_839	NCU02005.1	1.28		1.00	1.07	1.04	1.16	1.07	1.29	1.49	1.59	1.81
b15b3_110_71	NCU02007.1	1.62		1.44	1.66	1.38	1.25	1.00	1.26	1.54	1.49	1.48
b15b3_120_99	NCU02009.1	1.33		1.42	1.67	1.73	2.10	1.00	2.77	2.02	1.80	1.73
zz30_B15B3_190_12cf	NCU02016.1	1.31		1.04	1.13	1.44	1.37	1.19	1.00	1.24	1.22	1.21
b2j23_070_534	NCU02027.1	2.07		1.80	1.93	2.46	3.02	2.85	1.00	2.18	2.40	3.14
b2j23_170_6092	NCU02036.1	1.24		1.28	1.29	1.54	1.64	1.00	2.27	1.56	1.43	1.52
b2j23_185_108	NCU02038.1	1.37		1.00	3.24	3.95						
b2i10_130_154	NCU02041.1	1.86		1.50	1.52	1.65	1.73	1.00	2.20	1.47	1.49	1.31

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b2i10_090_977	NCU02044.1	2.64		2.16	2.72	2.70	2.23	3.16	1.00	2.00	2.00	2.34
b2i10_080_8	NCU02046.1	1.18		1.00	1.75	2.05	3.17	2.61	2.79	2.35	1.74	1.61
NCU02047.1_1	NCU02047.1	1.86		1.48	1.71	1.60	1.38	1.25	1.00	1.04	1.08	1.23
1nc338_070_1057	NCU02059.1	1.26		1.86	2.02	2.69	2.57	1.00	2.68	1.46	1.17	1.72
NCU02064.1_237	NCU02064.1	2.02		1.64	1.83	1.99	1.60	1.48	1.00	1.47	1.68	1.23
1nc340_020_1829	NCU02066.1	1.22		1.14	1.00	1.63	1.70	1.37	3.00	1.41	1.66	1.80
1nc340_080_1022	NCU02070.1	1.03		1.32	1.32	1.56	1.80	1.00	1.40	1.51	1.42	1.55
1nc340_090_840	NCU02071.1							1.00	2.59	3.98	2.92	4.01
1nc340_110_1927	NCU02074.1	1.00		3.38	2.31	1.66	1.83	1.59	1.69	1.38	1.49	1.61
1nc340_120_1315	NCU02075.1	8.98		6.51	6.19	3.13	1.96	2.58	1.00	2.47	2.72	3.14
1nc340_130_143	NCU02076.1	2.20		1.22	1.26	1.00						
1nc340_200_7566	NCU02083.1	1.00		1.06	1.07	1.07	1.11	1.39	1.22	1.09	1.11	1.12
1nc342_040_2110	NCU02089.1	1.00		1.19	1.20	1.31	1.29	1.44	1.33	1.39	1.30	1.29
1nc344_010_496	NCU02090.1	3.80		2.76	2.48	2.34	1.86	2.04	1.00	1.73	1.80	2.34
1nc346_030_202	NCU02095.1							1.00	1.81	1.74	1.79	1.67
1nc346_070_360	NCU02099.1	1.73		1.70	1.20	1.02	1.00	1.02	1.21	1.18	1.32	2.01
1nc348_010_1475	NCU02100.1	1.00		1.12	1.27	1.26	1.32	1.05	1.80	1.35	1.24	1.46
1nc348_020_2372	NCU02101.1	1.34		1.21	1.28	1.32	1.63	1.00	1.67	1.27	1.37	1.33
1nc348_040_739	NCU02102.1	1.02		1.74	1.43	1.71	2.20	1.18	1.03	1.00	1.07	1.56
1nc348_080_276	NCU02105.1	1.16		1.26	1.33	1.71	1.77	1.00	2.59	1.74	1.72	1.61
1nc348_120_1108	NCU02109.1	1.29		1.09	1.23	1.51	1.67	1.00	2.34	1.74	1.57	1.78
1nc352_020_666	NCU02116.1	1.00		1.02	1.15	1.54	1.80	1.08	2.06	1.84	1.73	1.69
1nc356_020_1123	NCU02122.1	1.19		1.11	1.16	1.38	1.69	1.00	2.24	1.54	1.49	1.52
1nc356_040_678	NCU02124.1	1.24		1.00	1.21	1.88	1.74	1.70	1.48	1.97	2.05	2.11
1nc356_060_971	NCU02126.1	1.00		1.00	1.01	1.45	1.93	1.11	2.00	1.63	1.79	2.40
1nc356_090_1090	NCU02130.1	1.20		1.14	1.21	1.22	1.31	1.00	1.66	1.08	1.13	1.23
1nc356_120_0	NCU02133.1	2.58		2.19	3.37	4.35	3.07	2.75	1.00	2.02	1.90	2.45
1nc356_130_2511	NCU02134.1	1.00		1.97	1.86	2.06	1.67	2.38	1.01	1.44	1.74	1.77
1nc356_140_523	NCU02136.1	2.36		1.43	2.34	2.27	1.95	2.15	1.00	1.81	1.77	1.88
1nc356_180_486	NCU02142.1	1.00		1.07	1.20	1.27	1.60	1.18	2.42	2.30	2.01	2.07
1nc360_020_730	NCU02146.1	1.20		1.25	1.38	1.44	1.61	1.00	1.55	1.35	1.31	1.19
1nc360_030_1337	NCU02147.1	1.09		1.56	1.73	1.88	2.40	1.00	1.43	1.57	1.59	1.56
1nc360_060_1028	NCU02150.1	1.00		1.10	1.01	1.27	1.39	1.08	2.05	1.80	1.88	1.88
1nc360_090_616	NCU02152.1	1.07		1.43	1.31	1.87	2.17	1.00	2.94	2.29	2.11	2.58
1nc360_100_1369	NCU02153.1	1.00		1.98	1.89	2.30	1.99	1.56	1.88	1.24	1.32	2.17
1nc360_140_128	NCU02157.1	1.17		1.41	1.29	1.58	1.69	1.00	2.03	1.32	1.43	1.54
1nc360_210_1382	NCU02164.1	1.23		1.00	1.20	1.89	3.34	1.27	6.35	4.48	2.91	3.81
1nc360_220_2568	NCU02165.1	1.64		1.56	1.36	1.69	1.69	1.00	2.39	1.81	1.93	1.84
1nc360_280_513	NCU02171.1	1.00		1.15	1.11	1.19	1.18	1.26	1.15	1.29	1.27	1.27
1nc380_006_3294	NCU02173.1	1.26		1.42	1.39	1.69	1.47	1.00	2.08	1.54	1.41	1.41
1nc380_008_240	NCU02174.1	1.15		1.15	1.31	1.40	1.64	1.00	1.70	1.17	1.17	1.05
1nc380_050_4149	NCU02178.1	1.00		1.27	1.59	2.63	3.13	1.43	3.17	2.32	2.90	5.30
1nc380_060_1585	NCU02179.1	1.00		1.16	1.18	1.04	1.25	1.46	1.16	1.22	1.29	1.18
1nc380_070_510	NCU02181.1	4.82		3.86	3.85	3.04	1.95	2.16	1.00	2.34	2.62	2.62
1nc380_090_3297	NCU02184.1	1.39		1.45	1.54	1.76	2.11	1.00	1.81	1.31	1.28	1.17
7nc536_030_1089	NCU02190.1	1.19		1.23	1.00	1.44	1.95	1.42	2.54	2.19	2.11	1.91
7nc536_040_455	NCU02191.1	2.39		1.15	1.00	1.16						
7nc536_060_1378	NCU02193.1	28.70		39.18	23.92	11.46	6.38	8.03	1.00	3.22	3.31	2.49
7nc536_120_125	NCU02199.1	1.13		1.13	1.27	1.28	1.42	1.00	1.50	1.49	1.28	1.36
7nc534_010_3462	NCU02202.1	1.00		1.12	1.29	1.99	2.46	2.09	1.95	1.97	2.64	3.23
7nc534_080_703	NCU02209.1	6.21		4.77	6.72	5.68	5.00	5.06	1.00	2.38	1.70	1.45
7nc534_090_2068	NCU02211.1	1.00		1.20	1.16	1.42	1.33	1.70	2.19	1.57	1.55	1.76
7nc530_020_2201	NCU02218.1	1.20		1.24	1.36	1.49	1.61	1.00	1.84	1.69	1.66	1.37
7nc530_030_258	NCU02219.1	1.71		1.85	2.00	2.25	2.46	1.23	1.00	1.41	1.47	1.58
7nc530_040_543	NCU02220.1	1.18		1.72	1.69	1.29	1.40	1.48	1.19	1.32	1.30	1.00
7nc530_080_1497	NCU02224.1	1.45		1.13	1.21	1.36	1.29	1.00	1.42	1.34	1.40	1.47
7nc529_030_2076	NCU02237.1	1.39		1.10	1.00	1.05						
7nc529_040_1273	NCU02238.1							1.28	1.00	1.15	1.24	1.27
b13d24_340_226	NCU02250.1	3.23		2.20	2.19	2.31	1.78	1.94	1.00	1.85	1.79	1.25
b13d24_320_1137	NCU02252.1	11.19		19.65	12.11	9.17	7.01	10.77	1.00	5.82	6.85	4.11
b13d24_310_218	NCU02253.1	1.05		1.29	1.31	1.63	1.71	1.00	1.83	3.44	3.24	3.28
b13d24_260_1579	NCU02257.1	1.26		1.29	1.00	1.17	1.26	1.21	1.31	1.14	1.15	1.32
b13d24_210_249	NCU02261.1	1.00		2.82	2.36	2.09	2.17	2.06	1.95	1.92	1.46	1.64
b13d24_190_312	NCU02263.1	1.30		1.12	1.68	2.09	2.72	1.00	2.85	1.76	1.28	1.67
b13d24_180_479	NCU02264.1	1.57		1.37	1.67	2.07	1.69	1.65	1.00	1.24	1.31	2.04
b13d24_110_972	NCU02271.1	1.10		1.09	1.50	1.62	2.00	1.00	1.97	1.83	1.76	1.75
b13d24_090_1101	NCU02273.1	1.10		1.00	1.07	1.69	2.04	1.27	2.93	1.60	1.72	2.30
b13d24_080_1060	NCU02274.1	7.50		3.88	5.01	5.40	3.81	4.02	1.00	1.99	2.80	2.30
b13d24_010_164	NCU02280.1	1.61		1.21	1.31	1.42	1.40	1.25	1.00	1.27	1.23	1.42
5l23_030_2573	NCU02284.1	1.97		1.88	1.84	2.23	1.95	1.00	3.54	2.50	1.99	1.99
5l23_060_525	NCU02287.1	1.15		1.00	1.16	2.45	4.14	1.52	5.44	2.07	2.06	2.16
5l23_170_645	NCU02298.1	1.11		1.20	1.27	1.44	1.82	1.00	2.34	1.63	1.54	1.42

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
5l23_220_486	NCU02303.1	1.06		2.05	1.73	1.88	1.63	1.00	2.78	1.81	1.36	2.14
5l23_240_374	NCU02305.1	1.12		1.00	1.18	1.18	1.49	1.06	1.80	1.43	1.39	1.51
5l23_250_1992	NCU02307.1	1.02		1.00	1.43	2.73	4.45	3.95	1.46	2.11	3.19	5.29
7nc527_080_1219	NCU02318.1	1.19		1.16	1.15	1.28	1.41	1.19	2.00	2.00	1.00	1.13
7nc527_100_1780	NCU02320.1	1.04		1.00	1.16	1.43	1.82	1.20	2.14	1.97	1.38	1.37
7nc525_010_944	NCU02322.1							1.00	5.50	5.41	3.81	4.59
7nc525_020_1722	NCU02323.1	1.00		1.09	1.01	1.37	1.81	1.00	2.74	2.07	1.81	2.02
7nc525_040_1450	NCU02325.1	10.41		10.2 9	11.6 0	8.15	7.30	12.3 7	1.00	7.82	8.81	6.45
7nc525_140_920	NCU02333.1	1.28		1.23	1.23	1.57	1.76	1.00	1.41	1.53	1.64	2.34
b23n11_060_1808	NCU02343.1							4.35	1.00	3.30	4.93	7.29
b23n11_050_636	NCU02344.1	1.25		1.34	1.45	1.69	1.84	1.00	2.59	1.89	1.84	1.65
7nc520_110_570	NCU02360.1	1.24		1.00	1.34	2.62						
7nc520_120_1207	NCU02361.1	1.29		1.80	1.39	1.82	1.56	1.71	1.00	1.67	1.71	1.49
7nc520_180_1297	NCU02367.1	1.00		1.07	1.20	1.12	1.11	1.24	1.06	1.09	1.16	1.07
7nc520_200_77	NCU02369.1	1.21		1.30	1.36	1.40	1.44	1.00	2.09	1.53	1.48	1.34
7nc520_220_467	NCU02372.1	1.07		1.00	1.02	1.22						
7nc520_230_786	NCU02373.1	1.41		1.00	1.21	1.15						
7nc515_040_839	NCU02386.1	1.00		1.31	1.53	1.51	1.76	1.13	2.15	1.96	1.36	1.42
7nc515_100_454	NCU02393.1	2.94		1.93	2.41	2.17	1.88	2.12	1.00	1.98	2.10	2.37
7nc515_110_1047	NCU02394.1	1.00		1.15	1.23	1.20	1.39	1.30	1.19	1.21	1.12	1.21
7nc515_120_835	NCU02395.1	1.17		1.68	1.96	1.87	2.03	2.48	1.00	1.80	2.49	2.01
7nc515_140_1654	NCU02397.1	1.24		1.00	1.35	2.33	2.23	1.15	3.79	3.55	3.22	3.44
7nc512_030_2474	NCU02406.1	1.19		1.23	1.04	1.00						
7nc512_040_1361	NCU02407.1	2.50		1.65	2.20	1.92	1.55	1.69	1.00	1.48	1.55	1.70
7nc512_100_1494	NCU02413.1	2.03		1.52	1.49	1.55	1.51	1.00	1.67	1.43	1.42	1.74
7nc510_050_1457	NCU02418.1	1.00		1.16	1.32	1.46	1.41	1.49	1.52	1.60	1.98	2.12
7nc510_080_1596	NCU02421.1	1.02		1.18	1.32	1.65	2.03	1.00	2.41	1.96	1.79	1.82
7nc510_100_854	NCU02423.1	1.93		1.60	1.07	1.00						
7nc510_110_997	NCU02424.1	1.00		1.13	1.12	1.43						
7nc509_030_1580	NCU02430.1	1.00		1.31	2.23	2.12						
7nc509_040_1117	NCU02431.1	1.00		1.16	1.18	1.18	1.21	1.39	1.47	1.20	1.23	1.58
7nc508_020_179	NCU02435.1	2.29		1.96	1.79	1.62	1.61	1.00	1.67	1.21	1.20	1.14
7nc508_040_235	NCU02437.1	2.12		1.58	1.46	1.42	1.33	1.00	1.42	1.13	1.15	1.06
7nc508_060_1147	NCU02438.1	1.58		1.18	1.54	1.56	1.41	1.53	1.00	1.79	1.98	1.43
NCU02447.1_107	NCU02447.1	1.33		1.47	1.52	2.18	2.80	1.00	4.46	3.40	3.09	3.31
7nc495_020_596	NCU02451.1	1.14		1.22	1.71	1.99	1.87	1.78	1.00	2.15	3.16	2.88
7nc495_040_68	NCU02453.1	1.79		1.55	1.76	2.78	2.48	2.88	1.00	2.29	2.23	2.60
7nc495_050_148	NCU02455.1	1.41		1.18	1.43	2.46	2.78	1.00	2.98	1.81	1.83	2.27
7nc495_080_490	NCU02458.1	1.26		1.81	1.86	2.22	2.36	1.97	1.00	1.24	1.27	2.15
7nc495_090_847	NCU02459.1	1.16		1.30	1.37	1.90	1.92	1.84	1.00	1.45	1.50	2.95
7nc495_100_1232	NCU02460.1	1.33		1.00	1.34	1.56	1.38	1.54	1.73	1.45	2.38	2.56
b1o14_300_1239	NCU02468.1	1.60		1.15	1.26	1.39	1.44	1.40	1.00	1.21	1.26	1.32
b1o14_280_110	NCU02472.1	1.74		1.55	1.67	1.73	1.53	1.21	1.00	1.18	1.24	1.14
b1o14_270_275	NCU02473.1	1.30		1.20	1.18	1.24	1.33	1.00	1.06	1.10	1.14	1.07
b1o14_260_78	NCU02474.1	1.49		1.34	1.15	1.82	1.33	1.70	1.00	1.91	2.11	2.07
b1o14_200_592	NCU02480.1	2.04		3.05	3.23	3.17	2.52	3.48	1.00	2.03	2.20	2.12
b1o14_190_1782	NCU02481.1	1.11		2.88	4.23	4.14	3.61	5.87	1.00	3.73	4.83	5.00
b1o14_130_41	NCU02488.1	1.24		1.32	1.30	1.43	1.38	1.00	1.43	1.34	1.29	1.19
b1o14_110_652	NCU02489.1	1.14		1.18	1.34	1.54	1.85	1.00	2.12	1.51	1.55	1.41
b1o14_120_957	NCU02489.1	1.00		1.00	1.19	1.24	1.47	1.36	1.39	1.32	1.14	1.36
b1o14_090_656	NCU02491.1	1.00		1.06	1.06	1.14	1.27	1.18	1.15	1.13	1.29	1.36
b1o14_030_2661	NCU02497.1	1.32		1.13	1.00	1.33	1.33	1.00	2.00	1.47	1.63	1.62
b1o14_010_314	NCU02499.1	1.40		1.49	1.59	1.73	2.00	1.00	1.85	2.04	1.70	1.71
1nc397_010_830	NCU02500.1	3.68		3.44	3.09	4.16	3.39	4.24	1.00	1.66	3.97	7.40
1nc397_040_759	NCU02503.1	1.00		1.07	1.20	1.33	1.64	1.02	1.84	1.48	1.44	1.45
NCU02505.1_3432	NCU02505.1	2.28		2.57	2.75	2.35	2.42	4.05	1.00	2.34	2.31	2.02
1nc400_030_78	NCU02509.1	7.44		5.14	6.23	4.41	2.87	2.92	1.00	3.14	3.71	3.51
1nc400_080_1388	NCU02514.1	3.92		2.88	2.73	2.16	1.65	2.12	1.00	1.74	2.01	1.70
1nc400_150_1054	NCU02521.1	1.08		1.11	1.25	1.51	1.87	1.00	2.96	2.17	2.05	1.98
1nc400_170_474	NCU02523.1							1.00	2.27	2.48	1.70	2.18
1nc400_190_2984	NCU02525.1	1.00		1.25	1.33	1.52	1.84	1.06	1.28	1.12	1.34	1.51
1nc400_310_1684	NCU02537.1	1.03		1.10	1.22	1.39	1.46	1.00	1.79	1.58	1.45	1.32
1nc400_350_667	NCU02540.1	1.00		1.32	1.24	2.19	2.15	1.46	4.49	4.59	4.08	4.53
1nc400_360_1393	NCU02541.1	1.09		1.00	1.15	1.46	1.43	1.14	1.96	1.65	1.71	1.86
1nc400_370_1077	NCU02542.1	2.03		1.84	2.38	2.05	1.65	2.75	1.00	1.56	2.13	2.48
1nc400_390_3081	NCU02544.1	1.00		1.08	1.17	1.93	2.13	1.54	3.07	2.29	2.42	2.90
1nc400_420_347	NCU02547.1	1.00		1.48	1.64	2.68	2.72	2.28	1.56	1.68	2.86	3.77
1nc400_430_778	NCU02548.1	1.42		1.90	1.92	1.52	1.69	1.13	1.00	1.35	1.82	2.43
1nc400_440_1360	NCU02549.1	2.45		1.78	1.60	1.26	1.05	1.59	1.00	1.25	1.48	1.39
NCU02551.1_91	NCU02551.1	1.00		1.18	1.19	1.02	1.38	1.68	1.31	1.30	1.33	1.26
1nc400_460_1042	NCU02552.1	1.01		1.00	1.01	1.20	1.34	1.25	2.21	1.76	1.70	1.98
1nc400_510_1179	NCU02555.1	1.33		2.60	2.10	2.09	2.20	2.46	1.00	1.45	1.82	2.18
b5k2_250_239	NCU02560.1	1.00		1.20	1.23	1.46	1.85	1.02	1.43	1.22	1.27	1.23

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b5k2_190_2666	NCU02566.1	1.90	1.75	1.85	1.95	1.92	3.00	1.00	1.41	2.13	2.36
b5k2_130_987	NCU02571.1	1.20	1.00	1.24	1.02						
b5k2_120_1611	NCU02572.1	1.43	1.28	1.46	1.36	1.48	1.00	2.81	2.49	1.61	1.86
b5k2_070_4429	NCU02578.1	1.72	1.31	1.24	1.13	1.17	1.00	1.19	1.16	1.12	1.04
b5k2_060_319	NCU02579.1	1.00	2.10	2.00	5.46	7.30	4.55	2.93	3.38	3.62	5.37
b5k2_050_1033	NCU02580.1	1.00	1.46	2.27	4.99	8.36	4.94	5.83	3.84	4.37	5.39
NCU02587.1_620	NCU02587.1	1.21	1.35	1.35	1.70	1.59	1.30	1.18	1.00	1.43	1.39
1nc418_080_19	NCU02595.1	1.30	1.63	1.82	2.08	1.76	1.00	1.63	1.61	1.72	2.08
1nc418_090_100	NCU02596.1	1.92	1.00	1.31	13.83	14.16	4.60	33.02	38.96	34.82	40.27
1nc418_110_113	NCU02599.1						1.00	2.29	1.76	1.01	1.61
1nc418_150_1000	NCU02603.1	1.52	2.32	1.97	2.08	2.07	1.97	1.00	1.56	1.61	2.05
53h1_170_38	NCU02605.1	1.82	1.16	1.00	1.03						
53h1_140_256	NCU02608.1	1.11	1.00	1.00	1.12	1.19	1.36	1.09	1.04	1.24	1.31
53h1_110_2257	NCU02611.1	3.78	1.84	1.00	1.02						
53h1_080_293	NCU02614.1	1.00	1.13	1.08	1.46	1.69	1.07	2.39	3.71	1.36	1.45
53h1_070_502	NCU02615.1	1.15	1.37	1.27	1.77	2.41	1.00	3.15	1.88	1.95	2.09
1nc419_020_393	NCU02623.1	1.38	2.26	2.17	1.43	1.02	1.02	1.00	1.48	1.38	1.37
1nc420_030_2914	NCU02626.1	1.19	1.22	1.36	1.45	1.66	1.00	1.55	1.44	1.34	1.21
1nc420_060_1085	NCU02629.1	6.84	6.73	9.00	6.13	4.09	4.59	1.00	3.79	3.58	2.83
1nc425_010_220	NCU02636.1	1.04	1.43	1.63	1.38	1.35	1.31	1.00	1.12	1.17	1.75
1nc425_020_2410	NCU02637.1	1.23	1.18	1.17	1.31	1.26	1.00	1.50	1.10	1.13	1.24
1nc425_030_858	NCU02639.1	3.26	3.71	4.66	3.07	2.13	2.11	1.00	1.49	1.58	1.37
NCU02647.1_34	NCU02647.1	1.17	1.30	1.27	1.64	1.96	1.00	2.48	1.73	1.68	1.78
NCU02649.1_23	NCU02649.1	1.00	1.83	1.77	1.45	1.83	1.34	2.74	3.92	1.73	1.54
b16b8_020_631	NCU02652.1						1.13	1.02	1.10	1.09	1.00
b16b8_080_574	NCU02658.1	1.18	1.29	1.36	1.10	1.11	1.20	1.11	1.13	1.14	1.00
b16b8_100_109	NCU02660.1	1.00	1.99	1.89	2.23						
b16b8_140_2755	NCU02664.1	1.00	1.08	1.16	1.12						
b16b8_170_744	NCU02668.1	12.51	10.84	8.46	4.12	3.10	3.29	1.00	1.68	2.13	1.72
b16b8_200_679	NCU02671.1	1.35	1.59	1.54	1.49	1.33	1.19	1.00	1.08	1.10	1.01
b12j7_150_1627	NCU02701.1	1.30	1.00	1.50	2.08	2.09	2.48	1.43	1.48	1.92	2.11
b12j7_140_615	NCU02702.1	1.17	1.00	1.00	1.30	1.92	1.42	3.21	2.33	1.33	1.98
b12j7_120_1552	NCU02704.1	1.00	1.27	1.19	1.39	1.43	1.07	1.45	1.54	2.04	2.53
b12j7_090_523	NCU02707.1	6.43	4.68	4.74	3.08	2.16	2.65	1.00	2.52	2.86	2.48
b12j7_080_152	NCU02708.1	4.57	3.71	4.00	3.19	1.91	2.06	1.00	2.19	2.25	2.35
b12j7_050_815	NCU02711.1	1.05	1.11	1.25	1.74	2.16	1.00	2.20	2.08	2.13	2.15
b12j7_040_832	NCU02712.1	1.00	1.02	1.18	1.42	1.46	1.16	1.38	1.61	1.66	1.60
b12j7_030_568	NCU02713.1	1.00	1.73	1.17	1.38						
1nc430_090_983	NCU02724.1	1.00	1.25	1.29	1.30	1.41	1.02	1.38	1.21	1.17	1.34
1nc430_210_1896	NCU02735.1	1.03	1.16	1.00	1.83	1.75	2.38	1.88	1.29	2.71	2.89
1nc430_220_45	NCU02736.1	1.91	1.47	1.64	1.60	1.64	1.00	1.71	1.47	1.57	1.73
1nc430_260_1219	NCU02739.1	1.00	1.24	1.36	1.70	1.89	1.61	2.18	2.18	1.92	2.35
1nc430_270_768	NCU02740.1	1.55	1.31	1.26	1.11	1.21	1.00	1.11	1.30	1.35	1.21
1nc430_310_157	NCU02744.1	2.78	2.17	2.41	1.73	1.16	1.23	1.00	1.42	1.58	1.38
1nc430_320_126	NCU02745.1	1.31	1.60	1.50	1.45	1.72	1.00	1.86	1.54	1.49	1.40
1nc432_050_308	NCU02754.1	1.05	1.00	1.03	1.11						
1nc432_070_808	NCU02757.1	1.41	1.19	1.07	1.00						
1nc432_080_986	NCU02758.1	1.17	1.00	1.36	2.25						
1nc434_010_628	NCU02759.1	1.00	1.37	1.75	2.55	2.88	1.65	3.41	2.39	2.40	3.90
1nc434_020_0	NCU02761.1	1.12	1.14	1.20	1.47	1.80	1.00	2.22	1.50	1.56	1.44
1nc700_020_278	NCU02765.1	2.61	1.17	1.00	4.68	6.60	1.37	14.38	8.81	7.34	9.17
1nc700_070_668	NCU02771.1	2.14	2.40	2.52	2.31	1.77	1.73	1.00	1.52	1.32	1.67
1nc700_110_323	NCU02775.1	1.08	1.11	1.23	1.61	2.01	1.00	2.35	1.81	1.72	1.53
1nc700_190_1385	NCU02783.1	1.00	1.10	1.16	1.35	1.46	1.28	1.39	1.41	1.36	1.29
1nc720_270_3801	NCU02794.1	1.20	1.10	1.16	1.20	1.31	1.42	1.00	1.13	1.18	1.24
1nc720_220_274	NCU02797.1	1.67	1.22	1.85	2.28	1.88	1.04	1.00	1.03	1.20	1.31
1nc720_210_490	NCU02798.1	1.50	10.10	4.43	3.99	5.10	6.76	1.00	5.00	5.56	4.80
1nc720_150_133	NCU02804.1	1.67	2.03	2.12	1.94	1.49	1.14	1.00	1.50	1.35	1.60
1nc720_120_205	NCU02807.1	1.64	1.46	1.34	1.78	1.75	1.69	1.00	1.26	1.30	1.07
1nc720_090_1051	NCU02810.1	1.34	1.04	1.36	1.43	1.17	1.00	1.10	1.18	1.14	1.19
1nc720_060_897	NCU02813.1	5.25	3.52	3.98	3.02	2.55	3.17	1.00	2.30	2.42	2.51
1nc720_040_3585	NCU02815.1	1.89	1.46	1.49	1.85	1.86	1.77	1.11	1.00	1.36	1.84
1nc720_010_474	NCU02818.1	2.06	1.69	1.73	1.63	1.55	1.34	1.00	1.92	1.38	1.68
1nc725_010_1575	NCU02819.1	1.42	1.29	1.24	1.38	1.38	1.00	1.40	1.30	1.26	1.17
1nc725_040_3048	NCU02826.1	1.00	1.07	1.06	1.17	1.18	1.30	1.56	1.88	1.33	1.33
1nc725_060_439	NCU02829.1	1.73	1.01	1.39	2.32	2.10	1.06	1.00	1.14	1.13	1.61
1nc725_070_3200	NCU02830.1	1.17	1.00	1.30	1.38	1.22	1.06	2.00	1.34	1.43	1.68
1nc725_090_350	NCU02834.1	1.21	1.22	1.33	1.42	1.57	1.00	1.94	1.59	1.59	1.63
NCU02836.1_34	NCU02836.1	1.05	1.00	1.02	1.26	1.36	1.22	1.39	1.39	1.26	1.52
b10d6_230_1445	NCU02839.1	2.32	1.87	2.44	2.22	1.92	2.19	1.00	1.47	1.87	2.26

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b10d6_220_1117	NCU02840.1	1.00		1.18	1.26	1.35	1.29	1.04	1.75	1.26	1.17	1.20
b10d6_160_458	NCU02850.1							1.00	2.46	2.22	1.81	1.80
b10d6_140_2776	NCU02853.1	1.12		1.00	1.03	1.24	1.94	1.70	1.23	1.48	1.76	2.10
1nc727_030_400	NCU02870.1	1.00		1.60	1.46	1.51	2.02	1.06	2.07	1.72	1.60	1.82
1nc730_050_1032	NCU02878.1							1.24	1.00	1.16	1.15	1.23
1nc730_100_996	NCU02883.1							1.07	2.96	1.31	1.00	1.68
1nc730_110_479	NCU02884.1	1.05		1.24	1.00	2.84	2.81	5.73	2.35	6.18	6.65	3.34
1nc730_140_177	NCU02887.1	1.13		1.00	2.41	4.17	3.81	3.85	1.16	3.05	3.66	3.56
1nc730_150_40	NCU02888.1	1.00		1.05	1.28	2.47						
1nc730_290_137	NCU02900.1	1.19		1.31	1.33	1.52	1.76	1.00	1.51	1.31	1.21	1.20
1nc730_340_48	NCU02905.1	6.26		4.99	5.45	3.67	2.53	2.56	1.00	2.90	2.99	2.90
1nc730_370_341	NCU02908.1	1.06		1.02	1.12	1.41	1.87	1.00	2.31	2.32	1.89	2.04
1nc730_380_148	NCU02909.1	1.16		1.22	1.29	1.58	1.72	1.00	2.14	1.96	1.86	1.95
1nc730_410_323	NCU02912.1	1.00		1.03	1.07	1.07	1.13	1.11	1.43	1.18	1.24	1.19
1nc730_450_1875	NCU02915.1	1.11		1.20	1.25	1.12	1.16	1.28	1.12	1.22	1.19	1.00
1nc730_480_7076	NCU02918.1	2.35		1.53	1.55	1.43	1.32	1.00	1.58	1.36	1.48	1.65
1nc730_550_1176	NCU02925.1	1.13		1.01	1.12	1.26	1.15	1.13	1.01	1.00	1.27	1.47
1nc730_610_1031	NCU02931.1	1.25		1.27	1.24	1.50	1.58	1.00	1.59	1.43	1.54	1.39
1nc730_620_65	NCU02932.1	1.00		1.31	1.25	1.45	1.65	1.16	1.62	1.61	1.57	1.54
1nc730_690_1848	NCU02940.1	1.13		1.00	1.09	1.03	1.21	1.15	1.05	1.28	1.26	1.57
1nc730_710_697	NCU02942.1	2.62		2.28	2.11	2.50	2.35	2.11	1.24	1.15	1.01	1.00
1nc730_720_1429	NCU02943.1	1.96		1.50	1.59	1.36	1.24	1.00	1.29	1.38	1.26	1.45
1nc730_740_1894	NCU02945.1	1.33		1.25	2.24	2.85	1.20	1.00	3.18	1.71	1.07	2.51
1nc730_750_789	NCU02946.1	1.00		1.15	1.23	1.33	1.57	1.61	1.78	1.88	1.69	1.72
b16d18_020_409	NCU02948.1	1.13		1.26	1.08	1.21	1.17	1.00	5.91	6.14	4.10	3.76
b16d18_030_835	NCU02949.1	1.00		1.08	1.05	1.01	1.02	1.17	1.06	1.02	1.06	1.04
b16d18_080_676	NCU02954.1	3.09		2.78	2.96	2.71	2.27	2.40	1.00	1.50	1.55	1.75
b16d18_090_2299	NCU02955.1	2.06		1.76	1.44	1.02	1.05	1.21	1.00	1.12	1.10	1.28
b16d18_100_1241	NCU02956.1	1.13		1.05	1.11	1.11	1.05	1.00	3.23	1.64	1.50	1.84
b16d18_140_91	NCU02959.1	1.97		1.88	1.78	1.66	1.53	1.16	1.00	1.54	1.25	1.22
b7f18_080_2064	NCU02972.1	1.43		1.09	1.11	1.16	1.44	1.74	1.00	1.02	1.25	2.42
b7f18_090_16	NCU02973.1	1.00		1.01	1.02	1.19	1.37	1.09	1.67	1.61	1.29	1.27
b7f18_140_3020	NCU02978.1	1.36		1.33	1.39	1.44	1.79	1.00	2.54	1.78	1.73	1.77
b24p7_040_1824	NCU02988.1	1.28		1.64	1.41	1.64	2.03	1.00	2.02	1.71	1.79	1.67
b24p7_060_871	NCU02990.1							1.00	2.49	2.39	1.65	1.52
b24p7_070_406	NCU02991.1	1.26		1.26	1.25	1.44	1.72	1.00	1.73	1.28	1.29	1.25
b24p7_220_397	NCU03004.1	1.95		1.47	1.52	1.41	1.33	1.00	1.31	1.19	1.20	1.26
NCU03005.1_458	NCU03005.1	1.00		1.29	1.46	1.76						
b24p7_280_3298	NCU03010.1	1.26		1.00	1.11	1.04						
b24p7_320_664	NCU03013.1	1.00		1.15	1.26	1.53	2.14	1.27	2.33	1.62	1.81	2.12
b18p24_130_1824	NCU03022.1	1.50		1.86	1.45	1.44	1.40	1.00	1.13	1.12	1.22	1.10
b18p24_080_947	NCU03029.1	1.25		1.26	1.28	1.52	1.61	1.00	1.91	1.65	1.62	1.66
1nc734_030_127	NCU03038.1	5.17		4.33	4.86	3.74	2.25	2.27	1.00	2.61	2.48	2.81
1nc734_040_789	NCU03039.1	1.82		1.85	1.82	1.93	1.75	1.34	1.00	1.25	1.30	1.28
1nc734_080_914	NCU03043.1							1.00	6.05	2.43	2.17	3.00
1nc735_010_19	NCU03044.1	1.00		1.03	1.64	2.13	2.95	1.15	4.35	3.15	2.29	2.49
1nc735_020_3449	NCU03045.1	1.00		1.02	1.28	1.47	1.79	1.23	1.52	1.49	1.29	1.40
1nc735_030_798	NCU03046.1	1.00		1.09	1.01	1.27	1.65	1.09	1.68	1.55	1.62	1.67
1nc735_060_909	NCU03047.1	1.17		1.08	1.00	1.36	2.09	1.15	3.35	1.79	1.79	2.05
1nc736_020_353	NCU03052.1	1.30		1.35	1.26	1.46	1.59	1.00	1.36	1.32	1.38	1.40
1nc460_050_1709	NCU03064.1	1.00		1.13	1.30	1.31	1.63	1.68	1.30	1.38	1.75	2.24
1nc462_010_2809	NCU03065.1							1.02	1.00	1.16	1.17	1.31
1nc464_010_1731	NCU03070.1	1.62		1.50	1.61	1.63	1.66	1.00	2.14	1.38	1.57	1.63
1nc464_110_1279	NCU03080.1							1.71	1.51	2.71	1.07	1.00
1nc464_150_1208	NCU03084.1	1.78		1.02	1.43	2.26	1.88	2.23	1.00	1.62	2.27	2.82
1nc466_040_1033	NCU03091.1	1.00		1.31	1.45	1.62	2.27	1.95	2.83	2.59	2.27	2.63
1nc466_050_703	NCU03092.1	2.57		2.99	1.53	1.00						
1nc470_020_100	NCU03099.1	1.00		1.12	1.33	1.39	1.67	1.03	1.25	1.27	1.27	1.35
1nc470_030_1252	NCU03100.1	2.27		1.00	1.90	2.13	1.58	2.09	1.27	1.87	1.85	1.98
1nc470_050_224	NCU03102.1	3.25		2.77	2.86	2.17	1.51	1.60	1.00	1.56	1.68	1.65
1nc470_060_4027	NCU03103.1	1.07		1.13	1.35	1.53	1.65	1.00	1.83	1.48	1.47	1.38
1nc470_090_619	NCU03106.1	1.01		1.07	1.22	1.46	1.92	1.00	1.97	1.72	1.70	1.82
1nc470_100_1637	NCU03107.1	1.00		1.81	1.92	2.22	2.86	3.00	1.35	1.68	1.66	2.20
1nc470_110_1648	NCU03108.1	1.00		1.03	1.31	1.63						
1nc470_120_739	NCU03109.1	1.22		1.20	1.21	1.41	1.48	1.00	2.00	1.47	1.42	1.49
1nc470_150_925	NCU03112.1	1.58		1.15	1.53	1.62	1.34	1.00	3.01	2.83	2.22	1.84
1nc470_200_1540	NCU03117.1	10.90		6.92	4.85	3.47	2.30	2.59	1.00	2.81	3.05	4.04
1nc470_210_1007	NCU03118.1	16.88		9.54	12.14	9.62	7.64	8.39	1.00	4.49	4.82	4.21
5c2_200_753	NCU03131.1	1.09		1.04	1.08	1.00	1.07	1.17	1.04	1.08	1.12	1.00
5c2_120_2465	NCU03139.1	7.90		7.87	7.80	6.32	6.28	12.64	1.00	4.07	7.07	4.66
5c2_110_1752	NCU03141.1	1.05		1.00	1.02	1.34	2.33	2.05	5.39	3.89	2.64	3.02
5c2_050_350	NCU03148.1	7.44		5.17	6.11	6.09	4.21	5.42	1.00	4.12	3.99	3.53

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
5c2_030_202	NCU03150.1	7.02		4.97	5.40	3.92	2.53	2.71	1.00	2.66	3.00	3.02
5c2_020_44	NCU03151.1	1.98		1.66	2.57	3.37	2.19	1.53	1.00	1.67	1.56	1.17
5c2_010_264	NCU03152.1	1.22		1.33	1.31	1.78	1.53	1.33	1.00	1.25	1.23	1.05
1nc478_030_232	NCU03155.1	1.51		1.44	1.62	1.67	1.58	1.00	1.04	1.39	1.38	1.21
1nc478_040_12	NCU03156.1	1.89		1.53	1.76	2.42	1.93	1.95	1.00	1.65	1.67	1.83
1nc478_120_4738	NCU03164.1	1.00		1.04	1.00	1.38	1.20	1.00	1.13	1.12	1.17	1.58
7c14_180_238	NCU03166.1	1.86		1.78	2.04	2.10	2.23	2.18	1.00	1.51	1.69	1.41
7c14_130_2131	NCU03171.1	1.77		1.71	1.65	1.60	1.57	1.98	1.00	1.32	1.38	1.30
7c14_100_1653	NCU03174.1	1.11		1.05	1.07	1.27	1.46	1.00	1.95	1.39	1.29	1.33
1nc480_070_51	NCU03192.1	1.51		2.33	2.21	2.96	2.76	2.24	1.00	1.53	1.82	2.44
1nc480_080_71	NCU03193.1	1.01		1.00	1.11	1.19						
1nc480_100_610	NCU03195.1	1.30		1.38	1.38	1.46	1.61	1.00	1.92	1.46	1.46	1.41
1nc480_150_133	NCU03199.1	2.40		2.04	2.17	2.33	2.01	1.98	1.00	1.80	1.76	1.79
1nc480_200_108	NCU03205.1	1.00		1.88	1.90	1.57	2.00	1.86	6.47	4.91	2.85	2.61
1nc480_370_68	NCU03222.1	1.00		3.04	2.30	2.90	3.63	1.91	3.43	2.10	2.27	1.90
1nc480_400_695	NCU03224.1							1.00	1.22	1.01	1.07	1.10
1nc480_390_1159	NCU03224.1	1.00		1.03	1.03	1.10	1.19	1.18	1.38	2.18	1.21	1.33
1nc480_480_80	NCU03233.1	1.47		1.20	1.18	1.37	1.22	1.20	1.00	1.09	1.15	1.19
1nc480_500_2513	NCU03235.1	1.03		1.00	1.10	1.19	1.23	1.12	1.57	1.50	1.43	1.46
1nc483_050_31	NCU03245.1	1.00		1.19	1.26	1.42	1.46	1.15	1.42	2.18	1.19	1.52
1nc490_010_1419	NCU03253.1	9.22		4.80	3.87	3.42	3.05	6.43	1.00	4.52	7.34	6.22
1nc490_020_1286	NCU03254.1							1.00	7.62	5.64	3.39	3.58
1nc490_050_880	NCU03257.1	2.01		2.46	1.85	2.21	1.77	1.29	1.00	1.30	1.09	1.03
1nc490_070_3283	NCU03260.1	1.60		1.04	1.05	1.56	1.43	1.00	2.37	2.04	2.35	2.37
1nc490_090_4317	NCU03263.1	2.30		1.05	1.00	1.23	1.31	2.07	1.10	1.07	1.66	1.85
1nc495_050_522	NCU03280.1	1.00		1.19	1.28	1.53	1.55	1.58	1.20	1.56	1.46	2.13
1nc495_060_217	NCU03281.1	1.43		1.70	1.69	1.79	1.82	1.88	1.00	1.59	1.71	1.81
1nc495_070_443	NCU03282.1	1.68		2.24	1.96	2.28	2.20	2.56	1.00	1.73	1.77	1.54
1nc495_080_544	NCU03283.1	3.92		3.10	5.02	6.40	5.24	6.33	1.00	2.20	3.11	3.50
1nc495_090_243	NCU03284.1	1.00		1.15	1.27	1.79	2.00	2.01	1.05	1.76	1.52	1.59
1nc495_160_1870	NCU03290.1	1.08		1.00	1.41	1.31						
1nc495_200_273	NCU03293.1	9.01		6.77	5.82	3.64	1.79	1.72	1.00	1.20	1.18	1.20
1nc495_240_744	NCU03297.1	2.30		2.27	2.91	2.23	1.81	1.71	1.00	1.64	1.30	1.18
1nc500_030_620	NCU03300.1	1.82		1.44	2.18	2.41	2.14	2.18	1.00	1.61	1.46	1.89
1nc500_060_64	NCU03302.1	6.14		4.69	5.11	4.23	2.59	2.88	1.00	3.30	3.35	3.70
1nc500_090_1643	NCU03305.1	1.36		1.18	1.37	1.73	1.93	1.00	2.34	1.71	1.41	1.57
1nc500_100_122	NCU03306.1	1.29		1.00	1.14	1.50	1.71	1.25	1.41	1.20	1.36	1.52
1nc500_120_1009	NCU03308.1	1.30		1.36	1.42	1.77	1.85	1.00	2.77	1.67	1.74	1.93
1nc500_130_159	NCU03309.1	1.32		1.34	1.67	1.81	1.56	1.73	1.00	1.12	1.29	1.52
1nc500_140_276	NCU03310.1	1.91		1.78	2.50	2.29	2.01	1.38	1.00	1.36	1.56	1.79
1nc500_170_89	NCU03313.1	1.01		1.00	1.28	1.70	1.79	1.74	1.25	1.84	1.88	1.96
1nc500_190_219	NCU03315.1	1.27		1.28	1.40	1.67	1.74	1.00	1.28	1.32	1.66	1.69
1nc500_200_1271	NCU03316.1	1.00		1.15	1.41	1.75	1.75	1.04	1.93	1.68	1.43	2.01
1nc500_220_983	NCU03318.1							4.31	1.00	4.22	5.69	7.34
1nc500_230_447	NCU03319.1	1.15		1.06	1.24	1.29	1.39	1.00	1.71	1.17	1.06	1.21
1nc500_280_1302	NCU03325.1	1.01		1.00	1.04	1.39	1.86	1.69	1.25	1.01	1.07	1.66
b10c3_060_355	NCU03333.1	1.00		1.50	1.33	1.35	1.17	1.54	1.07	1.30	1.10	1.27
b10c3_070_286	NCU03334.1	1.00		1.08	1.24	1.69						
b10c3_130_1005	NCU03339.1	1.31		1.03	1.17	1.30	1.16	1.31	1.00	1.78	1.68	1.62
b10c3_140_1	NCU03340.1	1.92		1.70	1.94	1.95	1.81	1.54	1.00	1.45	1.44	1.36
b10c3_180_646	NCU03344.1	1.17		1.14	1.18	1.30	1.40	1.00	1.64	1.38	1.38	1.32
b10c3_200_746	NCU03346.1	1.05		1.07	1.23	1.36	1.44	1.02	1.33	1.26	1.19	1.00
b23e9_010_1234	NCU03346.1	1.18		1.24	1.25	1.51	1.89	1.00	1.96	1.59	1.47	1.55
b23e9_020_1168	NCU03347.1							1.24	1.00	1.33	1.30	1.24
NCU03353.1_152	NCU03353.1	1.00		1.25	1.37	1.43	1.64	1.47	2.05	2.13	1.64	1.53
b9b11_090_221	NCU03368.1	1.37		1.00	1.08	1.44						
b9b11_110_252	NCU03370.1	1.23		1.38	1.00	2.10	2.28	2.05	2.07	1.79	1.95	1.17
b19c19_030_1055	NCU03392.1	1.03		1.13	1.08	1.44	1.56	1.00	2.35	1.73	1.65	1.44
b19c19_040_95	NCU03393.1	11.30		7.09	8.22	4.75	3.22	2.95	1.00	2.97	3.17	2.74
b19c19_050_577	NCU03394.1	1.41		1.32	1.31	1.31	1.60	1.00	1.88	1.54	1.52	1.45
b19c19_070_1269	NCU03396.1	3.83		2.12	1.36	1.00						
b19c19_140_776	NCU03402.1	1.00		1.15	1.45	1.42	1.53	1.37	1.43	1.42	1.34	1.41
b19c19_160_961	NCU03404.1	1.00		1.11	1.17	1.11	1.10	1.25	1.03	1.18	1.19	1.06
b11b23_030_400	NCU03407.1	2.77		2.54	2.53	2.75	3.06	1.95	1.45	1.16	1.00	2.40
b11b23_110_859	NCU03415.1	1.00		1.58	2.76	8.44	11.6	15.9	7.62	14.0	17.53	19.14
							3	3		3		
b11b23_120_3155	NCU03416.1	1.28		1.21	1.00	1.45	1.94	1.03	3.03	1.80	1.95	2.07
b11b23_200_430	NCU03425.1	2.20		1.48	1.61	1.28	1.19	1.15	1.00	1.36	1.34	1.26
b11b23_210_2025	NCU03426.1	1.00		1.39	1.20	1.23	1.27	1.47	1.30	1.22	1.36	1.48
b12f1_040_25	NCU03438.1	1.12		1.00	1.28	1.77	1.71	1.31	1.27	1.33	1.43	1.52
b12f1_050_1027	NCU03439.1	1.00		1.12	1.15	1.15	1.31	1.24	1.29	1.39	1.40	1.32
NCU03450.1_77	NCU03450.1	1.00		1.26	1.66	1.49						
b8j24_050_397	NCU03459.1	1.27		1.40	1.23	1.36	1.71	1.00	1.86	1.45	1.57	1.46
b8j24_090_1262	NCU03462.1	1.00		1.53	1.57	1.77	1.71	1.16	2.23	2.87	1.65	2.05

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b8j24_120_506	NCU03464.1	1.35		1.16	1.10	1.00					
b8j24_140_1347	NCU03466.1	1.00		1.21	1.35	1.49	1.57	1.17	2.27	1.71	1.48	1.48
b8l21_030_1414	NCU03471.1	1.00		1.07	1.04	1.10	1.20	1.32	1.17	1.23	1.18	1.11
b23h20_130_869	NCU03488.1	4.48		2.52	1.40	1.00						
b23h20_120_2444	NCU03489.1	1.25		1.30	1.33	1.44	1.59	1.00	1.69	1.53	1.58	1.38
b23h20_100_1625	NCU03491.1	1.13		1.01	1.00	1.12	1.06	1.25	1.35	1.71	1.73	1.70
b23h20_090_845	NCU03492.1	1.06		1.35	1.14	1.00						
b23h20_030_1203	NCU03498.1	1.10		1.43	1.37	1.40	1.49	1.00	1.73	1.55	1.50	1.37
b12n19_090_517	NCU03503.1	1.29		1.28	1.40	1.56	1.75	1.00	1.83	1.55	1.49	1.33
b12n19_020_1512	NCU03509.1	2.24		1.24	1.06	1.17	1.13	1.00	1.21	1.19	1.48	1.37
b11e6_080_3868	NCU03514.1							1.00	1.43	1.33	1.27	1.30
b11e6_060_132	NCU03516.1	1.58		1.53	1.81	1.57	1.52	1.00	1.12	1.34	1.36	1.32
b11e6_040_483	NCU03518.1	1.00		1.44	1.38	1.78	2.09	1.19	2.49	2.34	2.07	2.45
b2a19_190_3643	NCU03523.1	1.16		1.25	1.45	1.00	1.16	1.63	1.42	1.41	1.51	1.76
b2a19_130_587	NCU03530.1	1.94		1.31	1.29	1.62	1.92	1.00	2.93	3.17	2.80	2.18
b2a19_110_436	NCU03532.1	1.29		1.05	1.09	1.08	1.00	1.08	1.07	1.24	1.18	1.29
b2a19_030_2697	NCU03539.1							1.43	1.45	1.16	1.12	1.00
b7n14_210_447	NCU03549.1	1.10		1.15	1.29	1.37	1.41	1.00	1.48	1.18	1.10	1.18
zz30_B7N14_140_3cf	NCU03554.1	1.24		1.00	1.07	1.05						
b7n14_105_0	NCU03558.1	1.71		1.63	1.75	2.15	1.82	1.77	1.00	1.71	1.60	1.55
b7n14_100_382	NCU03559.1	2.49		2.28	2.07	1.64	1.50	1.39	1.00	1.42	1.47	1.21
b7n14_030_39	NCU03565.1	7.33		6.72	6.60	4.45	2.73	2.62	1.00	2.62	3.13	3.12
b7n14_020_264	NCU03566.1	1.00		1.07	1.06	1.82	2.27	1.15	2.01	1.81	1.59	1.66
b23i4_100_3027	NCU03575.1	6.66		5.00	5.88	4.55	4.06	6.96	1.00	5.45	6.00	4.11
g22f9_030_4922	NCU03591.1	1.63		1.49	1.24	1.19	1.20	1.12	1.48	1.00	1.40	1.36
g22f9_010_1581	NCU03593.1	1.34		1.98	1.47	1.43	1.38	1.45	1.04	1.01	1.00	1.09
b11h24_060_194	NCU03600.1	4.56		6.36	5.28	3.72	2.72	2.84	1.00	2.01	2.19	2.09
b11h24_090_1145	NCU03602.1	2.74		1.00	1.15	1.68						
b11h24_095_44	NCU03603.1	1.00		1.15	1.28	1.47	1.76	1.28	1.60	1.72	1.40	1.58
b11h24_110_803	NCU03605.1	1.00		1.26	1.97	2.71						
b11h24_150_1056	NCU03608.1	6.37		3.60	4.97	2.78	1.85	1.44	1.13	1.18	1.28	1.00
b11n2_315_248	NCU03614.1	1.11		1.02	1.00	1.12	1.15	1.28	1.39	1.28	1.32	1.48
b11n2_240_1770	NCU03622.1	1.26		1.16	1.53	1.72	1.72	1.73	1.00	1.21	1.58	1.56
b11n2_230_172	NCU03623.1	1.00		1.10	1.35	1.43	1.71	1.17	1.67	1.33	1.33	1.53
b11n2_100_540	NCU03634.1	1.33		1.54	1.45	1.47	1.52	1.62	1.00	1.18	1.41	1.40
b11n2_090_30	NCU03635.1	6.69		5.26	5.11	4.07	2.35	2.46	1.00	3.11	3.17	3.02
b11n2_060_832	NCU03639.1	1.00		1.92	1.93	3.72	3.63	2.64	2.31	2.28	2.35	2.15
b2f7_170_2824	NCU03647.1	1.44		1.43	1.60	1.59	1.16	1.00	1.92	1.89	1.73	1.90
b2f7_120_2975	NCU03651.1	1.22		1.25	1.16	1.05	1.05	1.13	1.00	1.05	1.06	1.00
b2f7_080_288	NCU03654.1	1.32		1.36	1.39	1.61	2.01	1.00	2.57	2.07	1.98	1.64
b2f7_020_2200	NCU03661.1	1.15		1.00	1.06	1.23	1.40	1.01	1.12	1.25	1.30	1.33
68b2_200_1449	NCU03667.1	1.31		1.00	1.02	1.79						
68b2_180_2316	NCU03669.1	1.49		1.12	1.11	1.00						
68b2_170_406	NCU03670.1	1.98		2.83	1.69	1.51	1.46	1.14	1.03	1.00	1.11	1.23
68b2_060_1423	NCU03681.1	1.19		1.73	1.72	1.79	1.68	1.56	1.00	1.28	1.48	1.84
68b2_030_517	NCU03684.1	1.00		3.83	3.50	2.59	3.20	3.61	1.29	2.39	2.55	2.52
b9b15_005_1480	NCU03686.1	1.80		1.32	1.32	1.46	1.61	1.38	1.00	1.01	1.39	1.35
b9b15_090_1	NCU03696.1	1.00		1.09	1.22	1.34	1.38	1.06	1.20	1.51	1.06	1.07
b9b15_150_29	NCU03700.1	1.42		1.41	1.25	1.42	1.11	1.00	2.36	2.58	2.45	1.90
b9b15_180_886	NCU03702.1	3.46		2.42	1.63	1.00						
b9b15_190_7	NCU03703.1	5.77		4.52	4.85	3.61	2.40	2.31	1.00	2.35	2.42	2.54
17e5_280_1467	NCU03713.1	1.99		1.70	2.11	2.66	1.90	1.07	1.11	1.00	1.15	1.92
17e5_170_1852	NCU03725.1	1.00		1.90	2.05	2.66						
17e5_140_1020	NCU03730.1							1.44	1.15	1.00	1.08	1.29
17e5_130_667	NCU03731.1	1.29		1.00	1.13	1.31	1.68	1.44	1.27	1.40	1.38	1.57
17e5_120_571	NCU03732.1	1.00		1.12	1.09	1.40	1.61	1.09	1.56	1.87	1.61	1.61
17e5_090_642	NCU03735.1	2.98		1.38	1.63	3.31	4.58	1.00	4.31	2.91	2.13	3.67
17e5_080_650	NCU03736.1	1.00		2.13	2.42	2.84	3.23	3.17	1.00	1.05	2.79	2.85
17e5_070_730	NCU03737.1	2.20		2.27	2.44	2.15	1.74	1.45	1.00	1.20	1.36	1.48
17e5_060_35	NCU03738.1	5.77		5.01	5.81	4.36	2.92	2.93	1.00	2.95	2.98	3.14
17e5_050_922	NCU03739.1	1.60		1.69	1.69	1.66	1.29	1.00	1.12	1.14	1.27	1.75
93g11_280_952	NCU03747.1	1.10		1.02	1.00	1.07	1.12	1.00	1.51	1.19	1.21	1.25
93g11_270_718	NCU03748.1	2.15		1.88	2.00	1.62	1.49	1.44	1.00	1.34	1.44	1.66
93g11_200_139	NCU03753.1	1.95		1.50	1.00	4.37						
93g11_170_1007	NCU03755.1	1.00		1.63	1.29	1.38	1.46	1.93	1.22	1.54	1.31	1.62
93g11_150_99	NCU03757.1	8.98		6.67	7.39	4.46	3.25	2.90	1.00	3.44	3.66	3.96
93g11_090_241	NCU03762.1	1.20		1.39	1.57	1.55	1.71	1.00	2.00	1.79	1.61	1.17
93g11_080_52	NCU03763.1	1.48		1.44	1.40	1.89	2.07	1.00	2.96	2.70	2.66	2.28
93g11_060_1434	NCU03765.1	1.05		1.00	1.07	1.45						
NCU03772.1_185	NCU03772.1	2.71		2.11	2.54	2.02	1.73	1.44	1.00	1.56	1.80	1.77
b18d24_270_677	NCU03773.1	1.29		1.31	1.32	1.54	1.98	1.00	2.47	1.88	1.82	1.59
b18d24_230_449	NCU03777.1	1.36		1.30	1.47	1.64	1.54	1.00	2.04	1.92	1.65	1.51
b18d24_220_61	NCU03778.1	1.27		1.22	1.34	1.66	1.58	1.01	1.28	1.42	1.00	1.17
b18d24_190_800	NCU03781.1	1.00		1.49	1.17	1.12	1.24	1.17	1.13	1.29	1.24	1.15

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b18d24_080_307	NCU03791.1	5.00		4.19	3.84	3.11	2.53	3.29	1.00	2.07	2.58	1.91
b18d24_060_3310	NCU03792.1	1.39		1.01	1.00	1.08	2.56	2.07	1.41	1.34	1.82	2.09
99h12_060_763	NCU03803.1	1.00		1.24	1.86	3.77	3.31	3.57	2.02	2.52	2.99	3.69
99h12_070_1401	NCU03804.1	1.50		1.06	1.06	1.45	1.27	1.31	1.03	1.00	1.33	1.64
99h12_080_255	NCU03805.1	1.00		1.20	1.14	1.17	1.21	1.47	1.16	1.19	1.20	1.14
99h12_090_129	NCU03806.1	5.92		4.82	4.98	3.88	2.65	2.58	1.00	2.84	3.01	2.78
99h12_160_510	NCU03813.1	1.96		2.69	2.58	2.12	2.50	3.06	1.00	2.14	2.50	2.23
99h12_230_5140	NCU03819.1	1.00		1.31	1.41	1.98	3.42	1.34	2.80	1.97	1.74	2.11
82c3_020_574	NCU03826.1	2.64		2.25	2.38	2.17	1.84	1.95	1.00	1.76	1.70	1.86
82c3_030_852	NCU03827.1	1.31		1.17	1.14	1.00						
82c3_050_1062	NCU03830.1							1.00	7.31	3.37	2.23	4.32
5nc200_010_47	NCU03833.1	1.22		1.00	1.35	1.66	1.52	1.06	1.43	1.60	1.65	1.61
6nc378_010_82	NCU03857.1	1.20		1.27	1.48	1.76	1.71	1.29	1.24	1.28	1.33	1.00
6nc378_040_351	NCU03860.1	1.00		1.43	1.63	1.81	2.10	1.43	1.50	1.47	1.72	2.29
6nc378_070_687	NCU03863.1	1.87		1.56	1.73	1.62	1.59	1.00	1.25	1.24	1.23	1.28
6nc380_050_1380	NCU03870.1	1.15		1.00	1.08	1.09	1.14	1.04	1.67	1.57	1.28	1.37
6nc380_080_88	NCU03873.1	1.00		1.73	1.59	1.71	2.80	1.69	2.76	1.06	1.13	1.09
6nc380_090_428	NCU03874.1	1.19		1.28	1.35	1.68	2.05	1.00	2.66	1.76	1.88	1.69
6nc380_110_809	NCU03876.1	2.10		1.34	1.55	1.20	1.04	1.00	1.02	1.25	1.42	1.48
6nc380_150_53	NCU03881.1	1.00		1.37	1.30	4.46						
6nc380_160_76	NCU03882.1	1.20		1.01	1.12	1.57	2.13	1.00	2.08	1.56	1.49	1.79
6nc380_170_40	NCU03883.1	1.05		1.00	1.11	1.22	1.34	1.07	1.63	1.45	1.31	1.43
6nc380_180_14	NCU03884.1	1.00		1.09	1.26	1.28	1.45	1.05	1.69	1.35	1.33	1.27
6nc380_190_1603	NCU03885.1	1.21		1.29	1.00	1.29	1.44	1.10	1.65	1.72	1.49	1.67
6nc385_040_1011	NCU03888.1	1.66		1.44	1.45	1.97	2.67	1.00	1.33	1.52	1.58	2.87
6nc385_060_1676	NCU03890.1	1.00		1.01	1.10	1.09	1.27	1.11	1.37	1.45	1.65	1.49
6nc385_070_333	NCU03891.1	1.16		1.03	1.14	1.64	1.29	1.43	1.00	1.37	1.27	1.87
6nc385_100_994	NCU03893.1	1.00		1.25	1.21	2.78	2.70	1.39	1.72	1.66	1.94	2.88
b23l21_050_3720	NCU03897.1	1.46		1.13	1.26	1.19	1.11	1.22	1.01	1.00	1.02	1.10
b23l21_120_70	NCU03904.1	1.30		2.11	1.74	1.98	1.86	1.24	1.00	1.50	2.04	2.20
b23l21_200_319	NCU03911.1	1.00		1.16	1.81	3.08						
b23l21_270_777	NCU03918.1	1.34		1.38	1.37	1.39	1.36	1.00	1.64	1.27	1.18	1.23
b23l21_350_1135	NCU03925.1	1.15		1.20	1.15	1.35	1.25	1.11	1.00	1.16	1.23	1.28
b23l21_390_2740	NCU03928.1	1.37		1.26	1.24	1.41	1.97	1.00	2.86	1.75	1.77	1.83
NCU03930.1_325	NCU03930.1	1.00		1.15	1.15	1.39	1.64	1.17	1.43	1.41	1.28	1.15
g17a4_330_866	NCU03931.1	1.20		1.07	1.07	1.02	1.00	1.08	1.52	1.10	1.18	1.15
g17a4_220_2108	NCU03947.1	1.74		1.00	1.07	1.17	1.17	1.16	1.37	1.20	1.34	1.55
g17a4_200_1017	NCU03949.1	1.77		1.76	2.05	2.13	2.03	2.32	1.00	1.67	1.85	2.17
g17a4_190_1432	NCU03950.1	1.23		1.00	1.01	1.01	1.05	1.14	1.31	1.05	1.09	1.01
g17a4_180_2289	NCU03952.1	1.31		1.06	1.00	1.05						
g17a4_170_217	NCU03953.1	1.31		1.10	1.31	1.34	1.34	1.19	1.00	1.14	1.17	1.16
g17a4_120_203	NCU03960.1	5.41		12.8	9.31	9.41	8.51	10.9	1.00	6.65	10.42	7.45
				8				5				
g17a4_090_863	NCU03963.1	2.44		3.19	2.73	2.08	1.59	1.84	1.00	1.70	1.82	1.70
g17a4_050_43	NCU03967.1	1.02		1.78	1.49	1.63	1.58	1.00	1.75	1.67	1.62	1.53
g17a4_020_198	NCU03970.1	1.00		1.11	1.26	1.47	1.86	1.29	1.84	1.56	1.30	1.24
NCU03973.1_433	NCU03973.1	1.00		1.20	1.36	1.56	1.61	1.18	1.29	1.25	1.12	1.09
6nc390_060_1042	NCU03979.1	1.26		1.00	1.48	1.48						
6nc390_090_1690	NCU03982.1	1.28		1.10	1.30	2.42	3.03	1.00	3.90	1.48	1.14	1.48
6nc390_120_156	NCU03984.1	1.22		1.20	1.34	1.59	2.17	1.00	1.88	1.53	1.47	1.47
6nc390_170_1222	NCU03987.1	1.01		1.05	1.19	1.47	1.51	1.00	1.56	1.69	1.36	1.50
6nc390_180_34	NCU03988.1	5.05		4.43	4.73	3.42	2.18	2.10	1.00	2.37	2.68	2.83
6nc390_200_515	NCU03990.1	1.44		1.00	1.22	1.37						
6nc390_270_105	NCU03997.1	1.00		1.10	1.09	1.47	1.67	1.14	1.83	1.53	1.50	1.55
49d12_020_1958	NCU04002.1	1.51		1.12	1.09	1.16	1.32	1.00	1.97	1.28	1.28	1.32
49d12_030_142	NCU04003.1	2.25		2.48	3.29	4.89	5.22	1.00	2.24	1.84	1.96	2.75
49d12_040_1173	NCU04005.1	1.71		1.30	1.14	1.11	1.15	1.00	1.61	1.05	1.22	1.32
49d12_050_248	NCU04006.1	1.00		1.01	1.24	1.40	1.39	1.32	1.84	1.60	1.46	1.36
49d12_130_2007	NCU04015.1	1.18		1.12	1.14	1.22	1.36	1.00	1.31	1.46	1.39	1.71
49d12_180_1525	NCU04020.1	2.53		1.71	2.06	1.81	1.74	2.65	1.00	1.12	1.86	2.05
b10h18_060_842	NCU04031.1	1.21		1.25	1.16	1.42	1.71	1.00	1.77	1.78	1.70	1.65
b10h18_090_955	NCU04034.1	1.24		1.63	1.00	1.80	2.40	1.17	1.99	2.19	1.83	1.99
b10h18_130_44	NCU04036.1	1.14		1.16	1.12	1.28	1.60	1.66	1.00	1.24	1.21	1.96
b10h18_160_120	NCU04039.1	1.33		1.68	1.91	1.69	1.50	1.48	1.00	1.54	1.84	1.01
b10h18_210_1294	NCU04044.1	1.37		1.16	1.30	1.55	1.44	1.48	1.05	1.00	1.03	1.19
b2c22_100_590	NCU04050.1	4.19		2.99	3.42	3.00	2.23	3.62	1.00	1.74	1.69	1.65
NCU04056.1_54	NCU04056.1	1.22		1.12	1.20	1.29	1.29	1.02	1.18	1.01	1.01	1.00
b2c22_040_5701	NCU04059.1	1.77		1.63	2.40	2.06	2.17	1.76	1.24	1.00	1.44	1.66
b2c22_020_255	NCU04061.1	1.00		1.15	1.37	1.54	1.55	1.23	2.12	1.93	1.74	1.22
6nc398_060_656	NCU04068.1	3.01		3.39	3.27	2.79	2.42	2.66	1.00	2.47	2.97	3.11
6nc398_130_219	NCU04074.1	1.31		1.25	1.50	1.76	1.75	1.65	1.00	1.03	1.10	1.31
6nc398_140_695	NCU04075.1	1.31		1.43	1.64	1.76	2.07	1.00	3.72	2.14	2.22	2.11
6nc398_160_2047	NCU04077.1	1.43		1.19	1.29	1.17	1.19	1.14	1.00	1.35	1.38	1.38
6nc398_180_1121	NCU04078.1	1.11		1.07	1.12	1.32	1.51	1.00	2.16	1.75	1.66	1.28

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
6nc398_170_1072	NCU04078.1	1.00		1.14	1.21	1.93	2.06	1.92	1.26	1.99	2.46	2.07
6nc398_200_594	NCU04080.1	1.00		1.21	1.24	1.56	1.34	1.16	1.27	1.51	1.31	1.47
6nc398_280_234	NCU04087.1	1.41		1.00	1.13	1.04						
6nc398_290_2303	NCU04088.1	1.04		1.01	1.01	1.33	1.57	1.00	1.71	1.54	1.40	1.52
6nc398_310_3166	NCU04090.1	1.14		1.14	1.16	1.46	1.85	1.00	2.66	1.77	1.65	1.55
b16m17_070_215	NCU04098.1	1.37		1.03	1.59	1.61	1.40	1.27	1.00	1.61	1.90	2.08
b16m17_040_2212	NCU04101.1							1.11	1.08	1.05	1.07	1.00
94c8_050_440	NCU04109.1	1.00		1.09	1.29	2.21	2.07	1.96	1.06	2.04	2.31	2.46
94c8_060_921	NCU04110.1	1.24		1.02	1.00	1.01	1.10	1.04	1.27	1.16	1.34	1.54
94c8_070_852	NCU04111.1	1.33		1.11	1.36	1.41	1.25	1.00	1.41	1.87	1.80	1.88
94c8_120_914	NCU04116.1	1.37		1.23	1.31	1.39	1.48	1.00	1.42	1.34	1.35	1.22
94c8_140_1469	NCU04118.1	1.58		1.18	1.31	1.00						
9g6_360_652	NCU04122.1	5.98		3.03	3.06	2.63	2.58	3.23	1.00	1.94	2.29	3.50
9g6_340_2086	NCU04124.1	1.00		1.02	1.19	1.02	1.06	1.15	1.33	1.35	1.15	1.15
9g6_330_2978	NCU04125.1	1.15		1.10	1.39	1.43	1.72	1.00	1.94	1.53	1.31	1.25
9g6_310_42	NCU04127.1	1.35		1.45	1.65	1.78	2.00	1.00	3.25	1.84	1.45	1.39
9g6_200_127	NCU04138.1	1.09		1.00	1.10	1.26						
9g6_180_0	NCU04140.1	2.69		1.64	2.24	3.21	2.51	2.93	1.00	2.51	2.92	2.61
9g6_170_1767	NCU04142.1	4.53		2.65	5.20	3.98	2.54	4.33	1.00	2.69	3.69	3.51
9g6_140_1337	NCU04145.1	1.17		1.31	1.33	1.32	1.31	1.00	1.78	1.12	1.10	1.24
9g6_060_124	NCU04151.1	1.25		1.36	1.32	1.71	1.55	1.00	1.42	1.27	1.24	1.15
9g6_030_844	NCU04154.1							1.17	1.04	1.09	1.09	1.00
9g6_020_297	NCU04155.1	1.13		1.00	1.90	1.90						
9g6_010_640	NCU04156.1	2.09		2.46	2.95	1.97	1.46	1.00	1.43	1.22	1.11	1.10
b7a16_230_556	NCU04158.1	1.26		1.25	1.24	1.29	1.42	1.00	1.39	1.38	1.07	1.17
b7a16_200_763	NCU04160.1	1.00		1.28	1.36	1.39	1.40	1.61	1.02	1.12	1.51	1.46
b7a16_130_1146	NCU04166.1	1.00		1.09	1.31	1.65	1.85	1.07	1.69	1.79	1.64	1.80
b7a16_050_520	NCU04173.1	1.93		1.25	1.67	1.93	1.70	1.34	1.12	1.03	1.00	1.23
b13o20_050_1534	NCU04179.1	1.00		2.16	1.73	2.63	2.39	1.41	1.84	2.01	1.94	2.10
NCU04181.1_51	NCU04181.1	1.35		1.11	1.12	1.52	1.60	1.00	1.12	2.68	1.79	1.67
b13o20_180_615	NCU04192.1	1.06		1.00	1.34	2.51	3.12	1.20	2.81	1.80	1.43	1.63
21d9_090_858	NCU04194.1	1.06		1.00	1.08	1.44	1.50	1.02	1.46	1.25	1.01	1.11
21d9_060_257	NCU04197.1							1.00	1.02	1.01	1.37	2.40
21d9_050_224	NCU04198.1	1.00		1.07	1.26	1.48	1.55	1.20	1.44	1.78	1.68	1.71
NCU04200.1_58	NCU04200.1	1.23		1.21	1.26	1.30	1.30	1.00	1.65	1.43	1.29	1.18
21d9_020_135	NCU04202.1	1.10		1.05	1.43	2.04	1.98	1.00	1.19	1.07	1.04	1.09
62d11_010_2791	NCU04203.1	1.40		1.00	1.12	1.32						
62d11_020_806	NCU04205.1	1.05		1.05	1.04	1.00	1.06	1.32	1.15	1.10	1.17	1.10
62d11_090_1091	NCU04212.1	1.00		1.26	1.37	1.61	1.73	1.01	1.84	1.69	1.51	1.53
62d11_110_217	NCU04216.1	2.35		4.37	2.32	1.96	1.67	1.75	1.00	1.58	2.04	1.71
g15d1_030_1130	NCU04219.1	1.00		1.13	1.15	1.42	2.00	1.03	2.67	2.08	1.93	1.86
g15d1_050_1992	NCU04221.1	1.00		1.55	1.15	1.42						
g15d1_100_680	NCU04227.1	1.25		1.36	1.46	1.22	1.21	1.65	1.00	1.37	1.65	1.74
2e4_010_268	NCU04230.1	1.00		1.44	1.75	3.55	4.75	2.90	3.22	3.09	2.67	1.85
2e4_050_682	NCU04234.1	1.00		1.13	1.13	1.48	1.39	1.87	1.08	1.12	1.79	1.72
2e4_070_1610	NCU04236.1	2.94		5.13	2.59	1.95	1.87	2.20	1.00	1.70	2.28	1.95
2e4_080_408	NCU04237.1	1.00		5.65	3.62	3.15						
2e4_090_1149	NCU04238.1	1.27		2.93	2.06	1.85	2.18	2.14	1.00	2.49	2.24	2.15
2e4_110_524	NCU04240.1	1.00		1.10	1.07	1.27	1.19	1.18	1.06	1.16	1.11	1.16
2e4_160_250	NCU04244.1	1.24		1.38	1.38	1.67	1.88	1.00	2.57	1.77	1.74	1.61
2e4_170_1387	NCU04245.1							1.00	1.61	1.35	1.25	1.17
g65a3_010_0	NCU04249.1	1.00		1.19	1.27	1.60						
g65a3_055_121	NCU04253.1	1.14		1.64	1.45	1.24	1.36	1.00	1.90	1.18	1.23	1.35
g65a3_120_176	NCU04261.1	1.35		1.29	1.38	1.51	1.63	1.00	1.89	1.64	1.55	1.27
zz30_G65A3_120_21vf	NCU04261.1	1.17		1.27	1.40	1.92	2.88	1.00	3.80	2.74	2.45	2.42
g65a3_130_1217	NCU04262.1	1.00		1.69	1.43	1.32						
b8l3_130_1738	NCU04265.1	1.00		2.79	5.08	10.09	14.26	31.53	2.98	14.55	15.40	11.65
b8l3_125_195	NCU04266.1	1.06		1.01	1.00	2.15	2.92	1.57	7.58	6.48	5.84	7.03
b8l3_110_494	NCU04268.1	1.17		1.40	1.30	1.43	1.62	1.00	2.38	1.72	1.75	1.51
b8l3_080_1976	NCU04270.1	8.83		12.65	5.75	4.29	3.59	6.42	1.00	2.82	3.63	5.45
b8l3_060_1846	NCU04272.1	1.00		1.44	1.29	2.19	3.36	1.79	5.14	3.15	2.91	3.91
b8l3_030_749	NCU04274.1	1.17		1.18	1.00	1.43	1.87	1.74	1.63	1.59	1.86	2.00
b8l3_010_96	NCU04276.1	110.62		39.75	38.62	27.14	13.94	24.69	1.00	28.59	31.07	16.44
b11a5_220_193	NCU04277.1	1.32		1.00	1.29	1.15						
b11a5_210_1728	NCU04278.1							1.00	1.96	1.53	1.49	1.68
b11a5_140_136	NCU04284.1	1.12		1.27	1.10	1.64	1.59	2.08	1.00	1.31	1.38	1.31
b11a5_120_507	NCU04287.1	1.00		3.74	4.63	5.95	5.83	4.93	3.21	3.53	4.91	4.07
b11a5_090_1784	NCU04290.1	1.55		1.54	1.59	1.86	2.41	1.00	2.17	2.52	1.85	1.65
b11a5_080_588	NCU04291.1	1.03		1.18	1.00	1.46	1.69	1.31	2.31	2.49	2.55	1.46
b11a5_070_1137	NCU04292.1	2.35		2.00	6.05	5.13	3.92	1.00	2.50	3.70	2.11	3.57
b11a5_040_2886	NCU04294.1	1.01		1.00	1.14	1.25	1.26	1.17	1.87	1.84	1.43	1.70

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b7h23_030_583	NCU04300.1	1.13		1.10	1.03	1.00	1.06	1.11	1.25	1.09	1.07	1.06
b7h23_060_1676	NCU04303.1	11.91		11.9	11.3	7.69	6.31	11.8	1.00	4.13	5.78	3.65
				6	0			8				
b7h23_070_128	NCU04304.1	3.96		2.99	3.41	3.60	2.57	2.71	1.00	1.94	1.90	1.77
b7h23_090_306	NCU04306.1	1.40		1.07	1.08	1.00						
NCU04311.1_9	NCU04311.1	1.14		1.24	1.43	1.61	1.71	1.04	1.16	1.17	1.18	1.00
b7h23_210_565	NCU04318.1	1.23		1.28	1.22	1.45	1.78	1.00	1.98	1.62	1.66	1.37
b7h23_250_834	NCU04322.1	1.00		1.46	1.73	2.17	2.73	1.76	2.99	2.43	2.53	2.84
b7h23_280_1706	NCU04325.1	1.00		1.13	1.12	1.38	1.91	1.04	2.66	1.97	1.73	1.64
b7h23_310_456	NCU04328.1	1.54		1.33	1.47	1.54	1.83	1.00	1.65	1.66	1.45	1.62
b7h23_350_30	NCU04331.1	8.44		6.63	7.53	5.08	3.36	2.96	1.00	3.44	3.53	3.20
4nc455_010_130	NCU04334.1	2.44		3.59	3.69	2.35	1.90	2.02	1.00	2.74	3.03	2.72
4nc455_040_976	NCU04337.1	1.14		1.09	1.14	1.61	1.56	1.20	1.47	1.00	1.35	1.64
4nc455_090_801	NCU04342.1	1.06		1.46	1.49	1.52	1.28	1.28	1.00	1.29	1.25	1.24
4nc455_100_2517	NCU04343.1	1.02		2.50	2.79	2.53	2.30	3.42	1.00	1.85	2.10	1.98
4nc455_110_840	NCU04344.1	1.83		3.23	2.82	3.05	2.99	2.93	1.00	2.60	2.89	2.14
4nc455_130_1217	NCU04346.1							1.00	1.40	1.15	1.17	1.10
4nc455_160_111	NCU04349.1	1.63		1.00	1.91	4.21	5.69	4.64	3.99	4.56	4.29	8.14
4nc455_200_5347	NCU04350.1	1.15		1.00	1.31	1.58	1.29	1.24	1.96	1.07	1.16	1.32
4nc453_040_1664	NCU04354.1	1.24		1.33	1.33	1.44	1.37	1.06	1.14	1.05	1.05	1.00
4nc453_050_2190	NCU04355.1	1.15		1.22	1.22	1.28	1.56	1.00	1.66	1.55	1.44	1.62
29e8_570_2030	NCU04358.1	1.70		1.95	1.99	2.17	2.16	1.75	1.00	1.56	1.73	1.67
29e8_550_507	NCU04360.1	1.00		3.47	2.21	2.49						
29e8_440_2752	NCU04373.1	2.42		1.89	1.85	1.97	2.02	1.00	1.30	1.06	1.21	1.48
29e8_390_1301	NCU04377.1	1.00		1.17	1.32	1.47	1.57	1.19	1.95	1.59	1.50	1.37
29e8_370_1990	NCU04378.1	1.30		1.00	1.07	1.10	1.07	1.19	1.01	1.02	1.29	1.62
29e8_360_153	NCU04379.1							1.00	3.85	2.12	1.39	1.64
29e8_330_1847	NCU04382.1	1.00		1.23	1.18	1.35	1.18	1.07	1.15	1.26	1.14	1.25
29e8_300_2163	NCU04385.1	2.81		2.33	3.38	2.72	2.02	2.08	1.00	1.71	2.03	2.95
29e8_290_898	NCU04386.1	1.17		1.22	1.21	1.44	1.54	1.00	1.75	1.67	1.48	1.89
29e8_280_72	NCU04387.1	1.02		1.00	1.31	1.73						
29e8_270_258	NCU04388.1	1.00		1.23	1.34	1.54	1.91	1.32	1.72	1.55	1.62	1.79
29e8_260_2733	NCU04389.1	1.10		1.00	1.14	1.57						
29e8_200_781	NCU04395.1	1.11		1.13	1.08	1.50	1.85	1.00	1.80	1.77	1.41	1.57
29e8_160_727	NCU04399.1							1.15	1.45	1.21	1.24	1.00
29e8_080_70	NCU04405.1	1.00		1.12	1.24	1.63	1.62	1.26	1.42	1.33	1.29	1.46
29e8_030_2371	NCU04410.1	2.99		2.86	2.36	2.43	2.14	2.43	1.00	1.36	2.03	1.93
g21b4_470_840	NCU04414.1	1.11		1.29	1.57	2.25	2.67	1.14	1.82	1.00	1.23	2.01
g21b4_460_1470	NCU04415.1	1.65		1.01	1.00	1.82	1.75	1.08	3.99	3.38	3.03	3.61
g21b4_440_276	NCU04417.1	2.55		1.01	1.00	2.54	2.38	1.64	8.33	6.88	6.44	8.81
g21b4_420_1272	NCU04419.1	1.38		1.07	1.00	1.22	1.30	1.19	2.28	1.18	1.18	1.45
g21b4_400_151	NCU04420.1	1.42		1.12	1.18	1.13	1.16	1.00	2.08	1.11	1.11	1.23
g21b4_390_1269	NCU04421.1	2.37		1.61	2.30	4.33	4.23	1.00	3.75	1.80	1.44	4.08
g21b4_380_2751	NCU04423.1	1.13		1.14	1.13	1.37	1.45	1.00	2.82	1.81	1.73	1.53
g21b4_360_1696	NCU04425.1	1.22		1.28	1.31	1.19	1.34	1.09	2.17	1.28	1.00	1.37
g21b4_340_2573	NCU04427.1	1.10		1.23	1.18	1.06	1.02	1.00	1.52	1.08	1.10	1.15
g21b4_320_1494	NCU04429.1	1.02		1.37	1.30	1.27	1.06	1.00	2.17	1.21	1.22	1.40
g21b4_300_31	NCU04431.1							1.00	5.16	2.25	1.49	2.07
g21b4_280_2390	NCU04433.1	1.29		1.27	1.26	1.13	1.11	1.35	1.00	1.20	1.74	1.67
g21b4_200_622	NCU04442.1	1.25		1.92	2.01	1.71	1.73	1.61	1.00	1.32	1.42	1.46
g21b4_130_1311	NCU04449.1	1.27		1.11	1.24	1.00						
g21b4_090_1031	NCU04452.1	1.59		1.47	1.56	2.32	2.63	1.00	6.09	3.58	2.73	2.38
g21b4_060_1790	NCU04455.1	1.34		1.28	1.30	1.47	1.68	1.00	1.56	1.23	1.69	1.44
g21b4_030_2024	NCU04457.1							1.07	1.25	1.20	1.15	1.00
g21b4_020_1302	NCU04459.1	1.07		1.22	1.22	1.33	1.44	1.00	1.30	1.24	1.12	1.09
4nc452_060_201	NCU04466.1	1.00		1.22	1.34	1.51	1.71	1.21	1.87	2.63	1.62	2.12
4nc452_070_176	NCU04467.1	1.00		3.47	3.51	4.59	3.67	2.64	5.80	6.76	4.56	6.64
4nc452_190_386	NCU04479.1	1.52		1.61	2.23	2.77	2.70	1.00	2.15	1.79	1.45	1.48
4nc452_260_3	NCU04486.1	1.00		1.20	1.36	1.71	1.95	1.43	3.12	2.35	2.27	1.84
4nc452_300_114	NCU04489.1	1.00		1.62	1.69	3.69						
4nc452_370_284	NCU04493.1	6.71		1.18	1.03	1.60	1.82	1.00	13.3	9.52	2.45	3.86
									0			
4nc452_450_293	NCU04501.1	1.00		1.08	1.21	1.45	1.73	1.10	1.74	1.56	1.47	1.45
4nc452_460_205	NCU04502.1	1.00		15.3	17.4	19.0	13.9	16.3	5.42	10.1	10.05	8.00
				3	6	5	5	7		6		
4nc450_030_2041	NCU04505.1	1.06		1.24	1.00	1.01	1.04	1.25	1.09	1.15	1.17	1.09
4nc450_080_510	NCU04510.1	11.35		5.45	5.29	11.2	5.70	3.65	1.00	3.83	4.19	5.72
						4						
4nc450_140_14	NCU04516.1	2.33		1.17	1.21	1.72	1.83	1.00	5.43	3.27	2.50	2.10
4nc450_190_661	NCU04521.1	1.26		1.31	1.62	3.07	2.77	2.91	1.00	1.73	2.16	2.03
4nc450_220_93	NCU04524.1	2.16		1.62	1.69	1.66	1.63	1.00	1.30	1.73	1.80	1.53
4nc450_240_643	NCU04526.1							1.40	5.87	1.85	1.00	1.18
4nc450_300_360	NCU04533.1							1.00	3.44	5.25	5.56	17.83
4nc450_320_2732	NCU04535.1	1.46		1.13	1.23	1.24	1.41	1.00	1.36	1.15	1.78	1.93

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc448_010_193	NCU04537.1	1.00		1.54	1.46	1.84	1.91	1.14	2.64	2.32	1.98	1.77
4nc448_020_3529	NCU04538.1							1.00	5.64	6.40	5.69	8.79
4nc448_060_325	NCU04542.1	3.81		1.10	1.20	1.00						
4nc448_070_529	NCU04543.1	2.69		1.00	1.21	1.25						
4nc446_050_200	NCU04552.1	5.90		5.23	5.04	4.04	2.47	2.59	1.00	3.00	3.06	3.75
4nc446_060_395	NCU04553.1	5.64		3.81	4.07	3.33	2.20	2.90	1.00	2.82	3.26	3.48
NCU04558.1_1117	NCU04558.1	1.56		1.62	1.13	1.40	1.47	1.00	4.61	3.78	1.67	2.66
NCU04562.1_32	NCU04562.1	1.00		1.83	1.61	2.44	2.02	1.69	1.87	2.63	1.86	2.29
80a10_050_560	NCU04568.1	1.02		1.02	1.07	1.20	1.29	1.00	5.46	2.36	1.38	1.15
80a10_060_3474	NCU04569.1	1.49		1.21	1.06	1.00						
80a10_170_886	NCU04579.1	1.45		1.20	1.39	1.31	1.39	1.00	1.24	1.16	1.04	1.01
80a10_200_513	NCU04583.1	1.46		2.04	1.82	1.49	1.47	1.66	1.00	1.37	1.41	1.30
80a10_300_112	NCU04592.1							1.00	1.17	1.43	1.40	1.23
80a10_310_1688	NCU04593.1							4.64	1.00	3.69	4.48	5.00
80a10_330_147	NCU04595.1	1.12		1.19	1.23	1.24	1.47	1.00	1.53	1.41	1.25	1.09
80a10_380_595	NCU04600.1	1.52		1.06	1.14	1.00						
80a10_410_422	NCU04603.1	14.52		6.62	5.31	3.41	2.65	3.94	1.00	1.61	2.60	1.67
80a10_430_191	NCU04605.1	1.22		1.00	1.06	1.67	1.69	1.69	10.57	6.30	4.94	5.08
b13h18_020_2085	NCU04610.1	1.00		1.20	1.09	1.10	1.22	1.20	1.49	1.40	1.25	1.25
b13h18_040_459	NCU04612.1	1.97		1.57	2.74	3.61	3.03	2.92	1.00	1.34	1.88	2.58
b13h18_050_557	NCU04613.1	1.02		1.00	1.04	1.10	1.28	1.30	1.17	1.24	1.26	1.32
b13h18_120_2607	NCU04618.1	1.00		1.13	1.23	1.85	2.67	1.02	3.43	2.65	2.35	2.32
b13h18_130_1277	NCU04619.1	1.84		1.57	1.46	1.19	1.08	1.00	1.17	1.41	1.30	1.22
b13h18_200_1176	NCU04625.1	1.00		1.17	1.27	1.67	1.57	1.30	1.80	2.01	1.32	1.47
b13h18_270_2807	NCU04631.1							1.00	2.48	1.78	1.61	1.60
5f3_020_2116	NCU04633.1	1.22		1.26	1.22	1.47	1.69	1.00	2.00	1.75	1.45	1.71
5f3_030_975	NCU04634.1	1.00		1.28	1.47	1.43	1.47	1.56	1.19	1.37	1.64	1.42
5f3_040_164	NCU04635.1	1.30		1.00	1.06	1.15	1.68	1.04	2.59	2.59	2.19	2.85
5f3_080_266	NCU04639.1	1.00		1.93	1.69	1.52	1.68	2.34	1.50	4.42	4.54	4.05
5f3_090_778	NCU04640.1	1.37		1.24	1.33	1.21	1.19	1.00	1.03	1.19	1.12	1.25
5f3_160_1004	NCU04647.1	1.23		1.00	1.06	1.19	1.17	1.04	1.19	1.40	1.31	1.48
5f3_170_1733	NCU04648.1	1.26		1.22	1.24	1.00						
5f3_210_2082	NCU04652.1	1.05		1.23	1.31	1.38	1.42	1.00	1.46	1.57	1.52	1.51
5f3_240_336	NCU04655.1	1.07		1.19	1.21	1.14	1.20	1.33	1.23	1.14	1.17	1.00
5f3_250_1113	NCU04656.1	1.77		2.07	2.19	1.64	1.41	1.19	1.28	1.15	1.06	1.00
x4g11_070_466	NCU04667.1							1.00	4.67	6.26	7.02	15.59
x4g11_130_2506	NCU04674.1	1.99		1.00	2.01	4.30	3.77	4.22	2.52	3.73	4.61	4.32
x4g11_140_533	NCU04675.1	1.48		2.90	4.05	5.21	5.11	6.65	1.00	3.65	5.34	4.15
x4g11_150_1942	NCU04676.1	1.00		1.12	1.52	2.67	1.91	2.02	2.19	3.02	2.64	2.07
6nc123_020_582	NCU04690.1	1.00		1.23	1.19	1.29	1.27	1.19	1.32	1.60	1.26	1.15
6nc125_080_426	NCU04699.1	1.25		1.00	1.22	2.02						
6nc130_010_412	NCU04702.1							1.00	2.76	1.99	1.57	1.88
6nc130_070_81	NCU04708.1	1.36		1.38	1.02	1.00	1.93	1.01	2.27	2.72	2.01	2.16
NCU04711.1_140	NCU04711.1	1.00		1.34	1.45	1.92						
6nc130_140_1316	NCU04718.1	1.00		1.69	1.36	1.07	1.25	1.27	1.78	1.33	1.31	1.86
6nc132_020_3005	NCU04720.1	1.45		3.87	2.36	1.89	1.91	1.52	1.00	1.35	1.33	1.12
6nc132_070_811	NCU04725.1	1.00		1.28	1.34	1.26	1.21	1.28	1.79	1.85	1.12	1.07
b8i24_020_894	NCU04727.1	1.00		1.25	1.40	1.29	1.65	1.02	5.48	3.46	1.70	1.58
b8i24_030_1570	NCU04728.1	1.02		1.06	1.14	1.10	1.03	1.00	2.68	1.55	1.38	1.21
b8i24_040_1936	NCU04729.1	1.00		1.57	1.28	1.56	1.94	1.73	3.83	2.61	2.07	1.98
b8i24_050_2563	NCU04730.1	1.71		1.39	1.37	1.49	1.33	1.54	1.38	1.00	1.59	2.10
b8i24_060_2586	NCU04731.1							1.00	1.34	1.08	1.05	1.01
b8i24_070_1625	NCU04732.1	2.10		1.21	1.06	1.08	1.08	1.00	1.26	1.32	1.36	1.39
b8i24_110_3727	NCU04736.1	3.04		1.00	1.29	1.72	2.18	1.12	2.61	1.51	1.57	1.54
b8i24_140_339	NCU04740.1	1.34		1.16	1.00	1.38	1.67	1.03	2.13	1.58	1.71	1.42
h4h7_190_2449	NCU04747.1	1.27		1.05	1.23	1.91	2.35	1.00	2.52	2.11	2.18	1.83
h4h7_140_262	NCU04752.1	1.26		1.15	1.19	1.33	1.37	1.00	1.70	1.40	1.37	1.21
h4h7_100_3204	NCU04757.1	1.11		1.00	1.02	1.14	1.74	1.33	1.68	1.19	1.16	1.21
h4h7_090_6	NCU04759.1	1.28		1.20	1.53	1.89	1.79	1.64	1.00	1.38	1.00	1.31
h4h7_040_1486	NCU04763.1	1.33		1.32	1.27	1.27	1.18	1.00	2.14	1.97	1.91	2.14
h4h7_030_41	NCU04764.1	1.03		1.08	1.25	1.77	2.33	1.00	3.11	2.29	1.70	1.84
h4h7_020_538	NCU04765.1	1.00		1.64	1.63	1.51						
b15b10_160_686	NCU04770.1	1.36		1.54	1.53	1.42	1.32	1.91	1.00	1.17	2.06	2.41
b15b10_150_1423	NCU04771.1	1.53		1.30	1.30	1.24	1.20	1.46	1.00	2.16	1.99	1.96
b15b10_110_1601	NCU04774.1	1.59		1.80	1.56	2.07	2.54	1.00	2.04	2.06	1.80	2.04
b15b10_040_682	NCU04779.1	5.48		3.83	3.92	2.78	1.82	2.36	1.00	2.34	2.77	2.90
b15b10_020_227	NCU04781.1	1.52		1.16	1.35	1.81	1.69	1.26	1.00	1.17	1.10	1.21
6nc138_030_1936	NCU04790.1	1.86		1.42	1.70	1.41	1.38	1.51	1.00	1.21	1.29	1.57
6nc138_040_918	NCU04791.1	1.11		1.30	1.53	1.26	1.28	1.48	1.05	1.30	1.33	1.00
6nc138_060_3874	NCU04792.1	1.44		1.15	1.34	1.47	1.53	1.10	1.60	2.66	1.00	1.04
6nc138_050_705	NCU04792.1	1.00		2.50	2.98	3.62	5.55	8.46	4.67	8.71	8.57	7.93
6nc138_090_476	NCU04796.1	1.00		1.92	2.42	8.40	13.63	8.65	11.94	7.73	8.26	11.77

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
6nc138_110_1925	NCU04798.1	1.21		1.39	1.43	1.65	2.01	1.00	3.06	2.11	2.04	1.71
6nc138_120_1238	NCU04799.1	2.58		1.76	1.49	1.00						
6nc138_150_572	NCU04802.1	1.00		1.62	1.90	2.94	3.59	3.65	4.93	3.53	2.87	3.79
6nc138_160_809	NCU04803.1	1.00		1.47	1.42	2.44	2.91	2.25	1.51	2.09	2.32	2.57
6nc138_180_101	NCU04805.1	1.00		1.16	1.05	1.38	1.88	1.59	2.63	1.68	1.32	2.16
6nc138_190_416	NCU04806.1	1.44		1.39	1.22	1.00						
6nc138_270_2226	NCU04814.1	2.06		1.00	1.16	1.69	1.97	1.54	3.12	2.38	2.05	3.09
6nc138_280_659	NCU04815.1	1.21		1.00	1.32	2.24	2.20	1.89	1.11	1.54	1.65	2.34
6nc138_290_15	NCU04816.1	1.04		1.30	1.43	1.44	1.91	1.66	1.00	1.18	1.37	1.60
6nc138_340_57	NCU04820.1	1.11		1.33	1.28	1.61	1.56	1.00	1.98	1.51	1.53	1.60
6nc140_020_696	NCU04823.1	1.09		1.00	1.13	1.39	1.83	1.81	12.50	12.19	6.82	5.99
6nc140_030_2258	NCU04824.1	1.00		1.22	1.04	1.05	1.81	1.22	1.15	1.28	1.21	1.52
6nc140_100_4263	NCU04834.1	1.00		1.25	1.06	1.42	2.36	1.53	1.74	1.60	1.63	1.99
6nc140_220_2621	NCU04848.1	1.00		1.63	1.52	1.74	2.47	2.43	1.95	2.00	2.63	2.97
xnc010_060_400	NCU04856.1	15.28		12.59	9.38	9.27	8.28	14.28	1.00	9.32	9.48	6.99
xnc010_110_2124	NCU04861.1	1.05		1.06	1.17	1.10	1.40	1.25	1.26	1.09	1.20	1.00
xnc010_120_1794	NCU04862.1	1.05		1.08	1.00	1.21	1.78	1.12	1.66	1.25	1.27	1.27
xnc010_130_7558	NCU04865.1	1.06		1.15	1.13	1.03	1.08	1.22	1.10	1.09	1.13	1.00
xnc010_170_236	NCU04870.1	1.34		1.27	1.33	1.48	1.63	1.00	2.01	1.60	1.63	1.37
NCU04880.1_95	NCU04880.1	1.10		1.30	1.15	1.34	1.70	1.00	2.67	2.48	1.54	1.65
xnc016_040_1018	NCU04883.1							1.00	16.42	3.77	1.39	1.51
xnc020_010_1415	NCU04887.1	2.01		2.22	1.33	1.00						
xnc020_060_72	NCU04892.1							1.00	1.97	1.47	1.46	1.53
xnc020_130_559	NCU04899.1	2.48		2.35	2.40	1.98	1.59	1.62	1.00	1.46	1.59	1.11
xnc020_140_47	NCU04900.1	1.07		1.22	1.22	1.40	1.71	1.00	2.65	2.06	1.45	1.54
xnc030_010_965	NCU04905.1	1.14		1.32	1.40	1.49	1.51	1.95	1.00	1.38	2.01	1.52
xnc030_050_810	NCU04908.1	1.00		1.23	1.24	1.04	1.15	1.06	2.04	1.75	1.45	1.42
xnc030_040_117	NCU04908.1	1.07		1.02	1.00	2.57	3.40	1.68	12.11	10.32	5.14	6.67
xnc030_060_756	NCU04909.1	1.07		1.08	1.20	1.09	1.14	1.22	1.00	1.19	1.23	1.21
xnc030_070_691	NCU04910.1	2.92		2.03	2.83	2.84	1.91	2.41	1.00	2.26	2.29	3.52
xnc030_110_722	NCU04914.1							7.15	1.00	2.89	7.03	7.45
xnc030_150_1282	NCU04918.1	2.15		2.56	2.25	2.34	1.88	2.02	1.00	1.28	1.34	2.74
xnc030_180_1123	NCU04921.1	1.00		1.33	1.44	1.37	1.35	1.36	1.76	2.47	2.24	2.31
xnc030_210_21	NCU04923.1	2.70		1.25	1.29	3.02	5.39	1.00	4.17	2.32	2.09	3.66
xnc030_220_275	NCU04924.1	1.36		1.04	1.10	2.35	2.95	1.00	3.71	2.58	2.27	2.82
xnc030_280_1745	NCU04930.1	1.10		1.00	1.07	1.04	1.14	1.06	1.49	1.21	1.15	1.10
xnc030_310_411	NCU04933.1							1.00	1.50	1.04	1.06	1.04
xnc030_450_147	NCU04946.1	1.37		1.00	1.67	1.93	1.86	1.53	2.95	2.07	1.42	1.63
xnc030_560_896	NCU04959.1	1.08		1.04	1.00	1.03	1.10	1.16	1.39	1.19	1.18	1.15
xnc030_600_1242	NCU04963.1	1.00		6.16	14.79	29.16	29.80	88.25	1.65	32.01	40.32	32.80
xnc031_010_164	NCU04969.1	1.10		1.27	1.16	1.17	1.31	1.39	1.00	1.17	1.35	1.18
xnc035_010_830	NCU04983.1	1.00		1.32	1.33	1.22	1.37	1.46	1.12	1.28	1.32	1.09
xnc036_010_1965	NCU04986.1	1.24		1.32	1.36	1.46	1.59	1.64	1.00	1.16	1.90	1.82
xnc036_030_817	NCU04988.1	1.00		1.24	1.51	1.78						
xnc037_010_970	NCU04990.1	1.26		1.20	1.20	1.15	1.02	1.29	1.00	1.14	1.19	1.36
NCU04994.1_1071	NCU04994.1	1.15		1.32	1.37	1.51	1.57	1.11	1.13	1.16	1.08	1.00
NCU04996.1_494	NCU04996.1							1.22	1.00	1.24	1.16	1.13
2nc610_140_155	NCU05008.1	2.13		1.62	1.73	2.01	1.76	1.96	1.00	1.74	1.71	1.60
2nc610_130_576	NCU05009.1	1.50		1.01	1.06	1.42	1.30	1.51	1.00	1.20	1.19	1.24
2nc610_120_831	NCU05010.1	1.31		1.41	1.45	1.57	1.64	1.00	1.82	1.64	1.44	1.46
2nc610_210_2910	NCU05013.1	1.16		1.08	1.20	1.48	1.88	1.00	2.46	1.95	1.82	1.69
2nc610_240_1942	NCU05016.1	2.04		1.98	2.01	2.25	2.17	2.00	1.00	1.57	2.40	3.36
2nc610_310_411	NCU05023.1	2.40		2.36	2.27	2.33	2.02	1.93	1.25	1.00	1.72	1.49
2nc610_490_2686	NCU05041.1	1.29		1.00	1.33	1.50	1.59	1.90	1.64	1.27	1.34	1.57
2nc610_520_1186	NCU05044.1	1.07		1.18	1.21	1.27	1.50	1.00	1.82	1.44	1.26	1.26
2nc610_620_5515	NCU05054.1							1.00	3.09	2.20	1.99	2.22
2nc610_680_746	NCU05060.1	1.00		1.13	1.25	1.65						
2nc610_710_117	NCU05063.1	1.24		1.37	1.35	1.53	1.55	1.00	1.42	1.28	1.07	1.13
2nc610_730_1549	NCU05066.1	1.13		1.00	1.07	1.32	1.54	1.24	1.75	1.24	1.28	1.35
2nc612_020_1478	NCU05069.1	1.00		1.24	1.33	1.57	1.70	1.47	1.76	2.10	2.19	1.92
2nc612_040_400	NCU05071.1	1.26		1.49	1.64	1.57	1.52	1.18	1.16	1.00	1.17	1.20
2nc612_140_74	NCU05080.1	1.00		1.18	1.05	1.38	1.51	1.03	1.17	1.22	1.33	1.22
2nc612_190_90	NCU05084.1	1.28		1.43	1.38	1.30	1.44	1.00	1.53	1.49	1.44	1.50
NCU05088.1_11	NCU05088.1	1.37		1.32	1.28	1.46	1.63	1.00	2.23	1.54	1.58	1.38
b23b10_050_201	NCU05092.1	1.16		1.08	1.00	1.08	1.38	1.13	1.15	1.17	1.18	1.19
b23b10_080_1474	NCU05095.1	2.27		2.00	2.30	2.14	1.98	2.35	1.00	1.50	1.55	1.45
b23b10_300_52	NCU05118.1	1.24		1.00	1.26	1.60	1.53	1.31	1.07	1.34	1.24	1.56
b19a17_010_585	NCU05121.1	1.13		1.11	1.13	1.23	1.50	1.00	1.74	1.51	1.45	1.35
b19a17_060_900	NCU05127.1	1.00		1.61	1.47	2.37	1.98	2.35	1.76	2.34	2.31	3.14

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b19a17_150_1018	NCU05136.1	1.83		1.36	1.19	1.01	1.00	1.09	1.84	1.20	1.17	1.08
b19a17_160_1045	NCU05137.1	3.10		1.82	1.31	1.22	1.18	1.03	1.56	1.58	1.00	1.04
b19a17_170_723	NCU05138.1	1.18		1.26	1.32	1.41	1.70	1.00	1.57	1.48	1.33	1.35
b19a17_190_83	NCU05141.1	1.48		1.01	1.05	1.42	1.59	1.00	1.44	1.28	1.21	1.73
b19a17_200_888	NCU05142.1	1.20		1.18	1.18	1.40	1.67	1.00	2.52	1.80	1.80	1.62
b19a17_210_1249	NCU05143.1	1.00		1.98	2.19	3.63	2.23	1.35	3.95	11.3	9.51	9.52
										5		
b19a17_220_1876	NCU05145.1	1.00		2.93	2.58	2.58	1.56	1.39	1.33	1.27	1.13	1.29
b19a17_250_138	NCU05148.1							1.00	3.50	6.80	4.43	6.66
4nc755_020_1148	NCU05161.1	1.00		1.10	1.12	1.47	1.76	1.06	1.77	1.52	1.63	1.53
4nc755_040_232	NCU05163.1	1.26		1.28	1.36	1.91	2.07	1.00	2.68	2.04	1.90	1.60
4nc755_060_270	NCU05165.1	1.01		1.61	1.64	1.61	1.66	1.71	1.00	1.34	1.30	1.11
4nc755_110_1296	NCU05169.1	1.52		1.76	1.71	1.40	1.00	1.27	6.88	4.75	4.14	3.21
g3c5_210_940	NCU05178.1	1.77		3.96	3.45	2.57	2.14	1.99	1.00	2.17	2.01	1.67
g3c5_180_1101	NCU05182.1	1.35		1.20	1.23	1.60	1.91	1.00	2.26	1.62	1.62	1.64
g3c5_110_2177	NCU05188.1							1.16	1.00	1.36	1.28	1.16
4nc760_120_435	NCU05209.1	1.24		1.23	1.28	1.48	1.92	1.00	3.12	1.87	1.90	1.68
4nc760_150_1820	NCU05212.1	1.14		1.15	1.26	1.40	1.47	1.00	1.39	1.30	1.29	1.18
4nc765_030_190	NCU05220.1	1.79		1.59	1.77	1.98	1.61	1.64	1.00	1.49	1.37	1.36
4nc765_040_94	NCU05221.1	1.57		1.36	1.40	1.53	1.49	1.08	1.00	1.48	1.42	1.20
4nc765_080_714	NCU05224.1	1.31		1.25	1.26	1.29	1.35	1.00	1.61	1.17	1.11	1.37
4nc765_110_250	NCU05227.1	1.12		1.20	1.35	1.52	1.61	1.00	1.36	1.14	1.08	1.37
4nc765_150_262	NCU05231.1	1.66		1.58	1.57	1.79	1.65	1.28	1.00	1.50	1.54	1.49
4nc770_030_220	NCU05237.1	1.42		1.33	1.41	1.60	1.64	1.00	1.61	1.48	1.35	1.20
4nc770_040_4334	NCU05238.1	1.54		1.35	1.48	1.49	1.53	1.81	1.00	1.21	1.37	1.96
4nc770_090_317	NCU05244.1	1.25		1.47	1.67	1.62	1.60	1.00	1.73	1.78	1.41	1.68
4nc770_120_481	NCU05248.1	1.32		1.45	1.51	1.45	1.47	1.35	1.00	1.14	1.39	1.30
4nc772_060_2916	NCU05255.1	1.03		1.15	1.08	1.00	1.13	1.20	1.11	1.12	1.15	1.00
4nc772_070_619	NCU05256.1	1.00		1.11	1.13	1.34	2.07	1.02	3.38	2.22	1.76	2.34
4nc774_010_1355	NCU05259.1	2.99		2.71	3.23	2.52	1.49	1.65	1.00	1.78	1.67	1.41
4nc774_020_2484	NCU05260.1	1.15		1.27	1.22	1.52	1.75	1.00	2.44	2.19	1.81	1.91
4nc774_030_3073	NCU05261.1	1.00		1.17	1.62	1.80						
4nc774_060_561	NCU05264.1							1.37	1.03	1.00	1.28	1.18
4nc776_010_2848	NCU05266.1	1.00		1.42	1.41	1.51	1.19	1.61	1.10	1.30	1.39	1.69
4nc776_020_3138	NCU05267.1	1.12		1.17	1.22	1.50	1.57	1.00	1.75	1.45	1.24	1.22
4nc776_040_1825	NCU05269.1	2.37		1.85	2.08	1.74	1.42	1.62	1.00	1.11	1.71	1.58
NCU05270.1_3136	NCU05270.1	3.59		2.08	2.26	2.16	2.12	2.66	1.00	1.66	2.17	2.85
4nc778_040_31	NCU05274.1	2.79		2.39	2.56	2.23	2.02	2.01	1.00	1.78	1.86	1.87
4nc778_060_203	NCU05275.1	1.00		1.38	1.45	1.81	1.52	1.50	1.20	1.65	1.75	2.25
4nc778_080_149	NCU05277.1	1.41		1.32	1.39	1.54	1.73	1.00	2.18	1.78	1.71	1.62
4nc778_090_1415	NCU05278.1	3.19		3.43	2.50	2.80	2.66	1.99	1.58	2.65	1.17	1.00
4nc780_060_574	NCU05291.1	1.00		2.69	2.19	2.35	2.49	3.37	2.37	2.15	2.69	2.62
4nc780_070_1239	NCU05292.1	1.04		1.00	1.03	1.00	1.31	1.36	1.52	1.19	1.29	1.18
4nc780_100_496	NCU05295.1	1.39		1.42	1.37	1.56	1.45	1.29	1.00	1.08	1.16	1.31
4nc780_120_2282	NCU05298.1	1.21		2.00	1.68	1.41	1.59	1.20	1.00	1.17	1.21	1.11
4nc780_130_529	NCU05299.1	1.63		1.46	1.46	1.65	1.47	1.41	1.00	1.21	1.18	1.42
4nc780_190_379	NCU05304.1	1.74		1.38	1.43	1.00						
4nc780_210_798	NCU05306.1	1.72		1.80	1.60	1.50	1.44	1.54	1.00	1.33	1.38	1.26
4nc782_100_247	NCU05316.1	1.00		1.03	1.05	1.05	1.06	1.24	1.17	1.20	1.22	1.18
4nc782_140_191	NCU05319.1	1.14		1.20	1.32	1.53	1.82	1.00	2.03	1.58	1.49	1.55
4nc782_160_1627	NCU05321.1	1.15		1.31	1.64	1.79	1.73	1.21	1.07	1.00	1.01	1.51
NCU05337.1_1	NCU05337.1	1.00		1.28	1.27	1.09	1.41	1.41	1.27	1.24	1.22	1.04
b15b24_010_74	NCU05338.1	13.08		15.0	12.3	15.5	15.0	20.0	1.00	16.3	19.89	17.11
				9	7	2	3	5		6		
b15b24_020_736	NCU05340.1	1.19		1.65	1.50	1.97	1.82	2.62	1.00	1.37	2.72	3.12
b15b24_070_1677	NCU05343.1	1.08		1.06	1.04	1.04	1.56	1.00	2.20	1.82	1.50	1.78
b15b24_090_664	NCU05346.1	1.00		1.26	1.45	1.64	2.25	1.31	3.89	3.24	1.43	1.66
b15b24_120_2977	NCU05349.1	1.04		1.03	1.02	1.00	1.04	1.19	1.06	1.03	1.06	1.00
NCU05357.1_289	NCU05357.1	1.00		1.13	1.29	1.34	1.33	1.25	1.06	1.13	1.15	1.05
NCU05359.1_45	NCU05359.1	1.00		1.12	1.26	1.45	1.45	1.61	2.09	1.52	1.58	1.65
NCU05366.1_41	NCU05366.1	1.12		1.16	1.30	1.52	1.59	1.00	1.56	1.34	1.32	1.22
NCU05374.1_354	NCU05374.1	1.00		1.05	1.35	1.45	1.72	1.59	1.73	1.95	1.74	1.86
b1d4_300_960	NCU05378.1	1.00		1.07	1.13	1.09	1.21	1.27	1.43	1.36	1.04	1.17
b1d4_330_471	NCU05381.1	1.08		1.18	1.21	1.27	1.46	1.00	1.38	1.37	1.34	1.40
b9i2_020_140	NCU05384.1	1.20		1.31	1.08	1.32	1.55	1.00	1.68	1.45	1.36	1.34
b16l14_070_823	NCU05386.1	1.22		1.33	1.22	1.61	2.06	1.00	2.29	1.67	1.66	1.97
b16l14_010_330	NCU05390.1	1.94		1.75	1.78	1.65	1.52	1.00	1.69	1.56	1.58	1.30
zz30_B16L14_010_8cf	NCU05390.1	2.03		1.71	1.68	1.54	1.49	1.00	1.71	1.48	1.51	1.25
b15i20_060_259	NCU05395.1	1.00		2.22	2.11	2.00	2.45	2.52	1.82	1.63	2.55	1.80
NCU05396.1_132	NCU05396.1	1.00		2.14	2.15	2.15	2.87	2.02	3.28	2.30	1.96	1.82
b15i20_140_43	NCU05404.1	1.55		1.73	1.75	1.71	1.52	1.25	1.11	1.11	1.06	1.00
b15i20_160_407	NCU05408.1	1.30		1.30	1.25	1.36	1.49	1.00	1.71	1.62	1.50	1.48
b7f21_110_645	NCU05410.1	1.72		2.20	2.71	2.36	2.36	2.11	1.00	1.10	1.19	1.33
b7f21_050_595	NCU05417.1							1.17	1.08	1.10	1.10	1.00

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b7f21_030_462	NCU05418.1	1.00		1.07	1.17	1.59	1.71	1.29	1.35	1.46	1.36	1.47
b7f21_010_639	NCU05420.1	1.72		1.20	1.34	1.00						
b8b20_330_1859	NCU05429.1	1.32		1.04	1.24	1.53	1.51	1.00	1.67	1.23	1.28	1.28
b8b20_320_1344	NCU05430.1	3.55		2.83	2.85	2.26	1.66	2.31	1.00	1.48	1.52	1.44
b8b20_235_437	NCU05437.1	1.10		1.21	1.25	1.13	1.20	1.28	1.06	1.15	1.14	1.00
b8b20_060_1835	NCU05454.1	1.16		1.00	1.27	1.85	1.89	1.34	1.51	1.29	1.32	1.38
b8b20_030_97	NCU05457.1	2.05		1.67	1.65	1.74	1.40	1.40	1.00	1.54	1.47	1.21
b7j19_010_1530	NCU05460.1							1.04	1.33	1.11	1.00	1.02
NCU05473.1_74	NCU05473.1	1.03		1.00	1.70	1.59	1.79	1.46	2.77	1.50	1.13	1.17
NCU05478.1_671	NCU05478.1	1.00		1.08	1.11	1.11	1.23	1.40	2.10	1.94	1.96	1.81
6nc350_030_193	NCU05488.1	2.31		1.00	1.27	2.38	2.27	2.38	2.89	2.86	3.22	3.37
6nc350_040_95	NCU05490.1	2.79		1.00	1.13	6.01	4.28	1.46	12.43	11.42	8.45	10.72
6nc350_090_383	NCU05494.1	2.63		1.95	1.84	1.75	1.59	1.00	1.31	1.56	1.49	1.86
6nc350_100_112	NCU05495.1	3.14		1.00	1.44	6.35	5.01	3.89	3.86	4.32	4.43	5.03
NCU05497.1_98	NCU05497.1	1.00		31.87	16.97	15.44	16.72	40.27	1.38	14.81	25.48	11.59
6nc350_130_274	NCU05498.1	1.00		8.47	5.04	3.99	3.60	5.54	1.51	4.04	4.51	5.07
6nc350_140_1179	NCU05499.1	1.00		1.03	1.00	1.03	1.22	1.12	1.32	1.19	1.33	1.84
6nc350_150_1235	NCU05500.1	1.00		1.00	1.03	1.05	1.21	1.15	1.80	1.44	1.52	1.55
6nc350_180_206	NCU05502.1	1.40		1.00	1.24	2.43	2.44	1.57	2.17	2.01	2.01	2.26
6nc350_190_405	NCU05503.1	1.00		12.33	6.15	6.62						
6nc350_210_268	NCU05506.1	1.00		4.71	2.98	2.72	2.42	3.15	1.18	2.01	2.96	3.71
6nc350_270_746	NCU05512.1	2.53		1.00	1.33	1.49	1.88	2.47	1.07	1.24	1.78	2.59
6nc350_290_935	NCU05514.1	1.02		1.19	1.26	1.12	1.21	1.34	1.09	1.16	1.19	1.00
6nc350_360_195	NCU05521.1	1.00		1.11	1.34	1.69	1.85	1.35	1.76	1.36	1.22	1.37
6nc350_380_232	NCU05523.1							1.00	1.41	1.45	1.26	1.20
6nc350_410_1244	NCU05526.1	3.55		2.65	3.11	2.15	1.72	1.85	1.00	2.24	2.21	2.52
6nc360_020_861	NCU05540.1	1.14		1.16	1.21	1.36	1.44	1.00	1.69	1.30	1.28	1.29
6nc360_070_3174	NCU05545.1	1.49		1.34	1.43	1.39	1.54	1.22	1.27	1.08	1.00	1.11
6nc360_160_131	NCU05554.1	6.13		4.72	5.26	3.52	2.64	2.64	1.00	2.57	2.74	2.82
6nc360_170_941	NCU05555.1	1.07		1.10	1.13	1.48	1.88	1.00	2.03	1.90	1.74	1.60
6nc360_220_1656	NCU05560.1	1.18		1.15	1.15	1.48	1.79	1.00	1.90	1.56	1.49	1.46
6nc360_230_0	NCU05561.1	4.22		5.34	4.31	3.47	2.33	2.68	1.00	1.96	1.95	2.69
6nc360_290_104	NCU05568.1	1.17		1.21	1.30	1.58	1.84	1.27	1.71	1.41	1.00	1.18
6nc360_310_399	NCU05569.1	1.27		1.38	1.39	1.68	1.95	1.00	2.50	1.91	1.80	1.70
6nc360_330_628	NCU05571.1	1.00		1.34	1.42	2.20						
6nc360_360_83	NCU05574.1	1.30		1.32	1.41	1.44	1.42	1.00	1.24	1.27	1.25	1.12
6nc360_390_2296	NCU05577.1	1.00		1.13	1.36	1.35						
6nc360_400_1311	NCU05578.1	1.22		1.38	1.39	1.87	2.23	1.11	2.17	2.61	1.00	1.30
6nc360_420_1454	NCU05580.1	1.00		1.13	1.30	1.35	1.42	1.46	2.47	2.22	2.24	2.06
6nc360_450_104	NCU05583.1	1.00		1.00	1.18	1.64	2.53	1.04	2.94	2.16	1.95	2.03
6nc360_470_1191	NCU05585.1	1.00		1.19	1.16	1.12	1.19	1.46	1.14	1.31	1.33	1.18
6nc360_520_4123	NCU05591.1	1.00		1.31	1.59	1.72	1.58	1.54	1.15	1.64	1.53	1.84
6nc360_540_451	NCU05593.1	1.02		1.00	1.06	1.96						
6nc360_550_900	NCU05594.1	1.32		1.55	1.71	1.74	1.58	1.68	1.00	1.48	1.40	1.25
6nc360_580_745	NCU05597.1	1.06		1.12	1.19	1.97	2.92	1.00	6.39	2.95	2.97	3.53
6nc360_600_120	NCU05599.1	5.78		4.56	5.01	4.04	2.74	2.97	1.00	2.86	2.95	3.00
6nc360_630_484	NCU05601.1	1.76		1.30	1.00	1.15						
45b12_050_130	NCU05618.1	1.27		1.17	1.16	1.39	1.63	1.00	1.40	1.35	1.31	1.28
45b12_040_166	NCU05619.1							1.00	6.78	10.01	7.14	6.44
45b12_020_877	NCU05621.1	1.00		1.13	1.29	1.29	1.32	1.39	1.39	1.43	1.30	1.49
6nc365_070_216	NCU05626.1	1.23		1.25	1.30	1.45	1.67	1.00	1.55	1.36	1.23	1.21
6nc365_080_1380	NCU05627.1	1.00		2.11	3.15	4.11	5.83	9.31	2.20	4.52	4.76	4.27
6nc365_130_129	NCU05631.1	1.29		1.47	1.30	1.20	1.23	1.06	1.08	1.01	1.01	1.00
6nc370_030_177	NCU05639.1	1.00		1.27	1.27	1.75	1.99	1.29	1.60	1.57	2.03	2.03
6nc370_040_2771	NCU05640.1	1.09		1.08	1.02	1.05	1.70	1.00	1.81	1.24	1.22	1.31
6nc370_060_1548	NCU05642.1	1.29		1.18	1.35	1.67	2.04	1.00	2.92	1.94	2.02	1.91
6nc370_070_1011	NCU05643.1	1.06		1.13	1.16	1.29	1.41	1.00	1.68	1.59	1.55	1.61
6nc370_120_2158	NCU05648.1	1.04		1.06	1.04	1.00	1.19	1.18	1.54	1.16	1.16	1.12
3nc114_020_253	NCU05656.1	1.00		1.15	1.23	1.16	1.32	1.37	1.15	1.29	1.31	1.04
3nc114_040_1418	NCU05658.1	1.25		1.30	1.31	1.50	1.63	1.00	1.73	1.31	1.32	1.27
3nc116_050_2261	NCU05664.1	1.01		1.03	1.02	1.00	1.26	1.22	1.23	1.06	1.09	1.16
3nc116_070_54	NCU05666.1	1.00		1.30	1.38	1.70	1.59	1.34	1.95	1.63	1.44	1.25
3nc116_080_178	NCU05667.1	2.96		1.96	1.47	1.05	1.43	1.00	3.46	1.37	1.27	1.06
3nc118_040_240	NCU05675.1	1.00		1.36	1.49	2.00	2.78	1.08	3.69	2.48	2.20	2.09
3nc118_090_845	NCU05680.1	1.24		1.17	1.43	1.62	1.45	1.00	1.93	1.70	1.69	1.21
3nc120_020_1126	NCU05685.1	1.75		1.17	1.01	1.00	1.02	1.18	1.35	1.37	1.02	1.31
3nc120_030_906	NCU05686.1	3.64		4.73	3.61	3.08	3.34	4.92	1.00	2.95	4.53	5.92
NCU05690.1_38	NCU05690.1	1.00		1.39	2.11	2.17	2.16	1.89	3.89	5.24	1.63	1.68
3nc120_170_1183	NCU05700.1	1.28		1.20	1.13	1.42	1.72	1.00	2.61	1.96	1.88	1.74
NCU05702.1_18	NCU05702.1	1.18		1.29	1.20	1.41	1.76	1.00	2.07	1.63	1.46	1.45

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
3nc120_210_422	NCU05706.1	1.00		1.40	1.13	2.15	2.02	1.09	3.23	2.56	2.89	3.58
3nc130_060_97	NCU05714.1	1.18		1.14	1.22	1.38	1.48	1.00	1.21	1.23	1.28	1.22
3nc130_070_147	NCU05715.1	1.01		1.00	1.05	1.42	1.61	1.05	2.34	1.47	1.41	1.54
3nc130_120_601	NCU05720.1	1.00		1.33	1.63	1.96	2.21	1.69	1.99	1.97	1.64	2.07
3nc130_130_2779	NCU05721.1							1.00	2.65	2.60	2.80	3.69
3nc130_150_3512	NCU05723.1	1.98		3.39	1.78	1.75	1.58	1.40	1.03	1.00	1.60	1.65
3nc130_160_1789	NCU05726.1	1.05		1.00	1.24	1.48	1.69	1.05	2.10	1.49	1.39	1.50
NCU05727.1_1	NCU05727.1	1.00		1.23	1.09	1.44	3.46	1.12	3.88	1.85	1.66	1.63
NCU05729.1_44	NCU05729.1	1.42		1.49	1.39	1.74	2.06	1.00	3.15	2.63	2.84	3.02
zz30_3nc140_030_16cf	NCU05731.1	1.00		1.04	1.18	1.38						
3nc140_030_163	NCU05731.1	1.00		1.16	1.45	1.62	1.88	1.41	1.86	1.71	1.82	2.06
NCU05734.1_62	NCU05734.1							1.00	4.13	2.99	2.24	2.39
NCU05744.1_176	NCU05744.1	1.05		1.04	1.04	1.11	1.10	1.00	1.78	1.75	1.50	1.48
7nc600_040_804	NCU05752.1	1.86		1.64	1.29	1.00						
7nc600_160_791	NCU05764.1	1.00		1.04	1.03	1.04	1.14	1.13	1.28	1.41	1.49	1.50
7nc600_220_324	NCU05768.1	1.00		5.28	3.81	14.66	53.18	5.25	61.09	34.66	133.03	153.35
7nc600_240_2192	NCU05770.1	1.00		1.30	1.68	2.89	3.45	2.73	2.91	3.45	3.86	6.89
7nc605_060_280	NCU05778.1	1.00		1.26	1.57	1.90	1.45	1.38	1.20	1.76	2.17	3.51
7nc605_110_1432	NCU05783.1	1.00		1.22	1.37	1.63	1.81	1.33	1.80	1.48	1.25	1.32
NCU05786.1_186	NCU05786.1	1.49		1.03	1.07	1.03	1.05	1.08	1.00	1.06	1.31	1.06
7nc605_160_180	NCU05789.1	2.13		1.79	1.66	1.88	1.81	1.00	2.23	1.56	1.69	1.68
7nc605_220_471	NCU05795.1	1.00		1.17	1.22	1.41	1.49	1.30	1.23	1.56	1.65	1.75
7nc605_230_361	NCU05796.1	1.00		1.15	1.26	1.51						
7nc605_270_96	NCU05800.1	1.89		1.81	1.78	1.38	1.36	1.15	1.00	1.13	1.28	1.32
7nc605_310_362	NCU05804.1	4.01		3.26	3.29	2.51	1.90	2.22	1.00	2.38	2.84	2.64
7nc605_360_517	NCU05810.1	7.22		5.02	5.54	3.35	2.26	2.56	1.00	2.73	2.86	2.60
7nc605_390_953	NCU05813.1	2.75		2.03	1.86	1.38	1.16	1.00	1.65	2.73	2.80	2.73
7nc605_410_77	NCU05816.1	1.71		1.33	1.36	1.66	1.46	1.57	1.00	1.39	1.48	1.38
7nc605_440_94	NCU05819.1	1.05		1.15	1.24	1.51	2.02	1.00	2.78	2.02	1.90	1.63
7nc605_510_1144	NCU05826.1	3.15		1.91	1.34	1.00						
7nc605_550_1044	NCU05829.1	1.41		1.41	1.26	1.18	1.07	1.00	1.01	1.15	1.14	1.00
7nc605_640_9483	NCU05837.1	1.20		1.00	1.32	1.25	1.34	1.49	1.28	1.13	1.21	1.21
7nc605_680_899	NCU05841.1	1.00		1.17	2.04	2.92						
7nc605_710_70	NCU05844.1							1.00	13.33	12.60	8.54	8.62
7nc610_010_722	NCU05848.1	1.00		1.11	1.13	1.09	1.13	1.28	1.12	1.20	1.16	1.10
7nc610_030_860	NCU05850.1	2.02		1.00	1.49	3.55	3.67	3.29	2.26	2.85	1.94	4.79
7nc610_060_889	NCU05853.1	1.46		1.58	1.98	2.69	2.93	1.77	1.00	1.51	2.42	4.26
7nc610_090_2795	NCU05856.1	1.21		1.19	1.33	1.47	1.56	1.00	2.13	1.82	1.55	1.43
7nc610_110_3185	NCU05858.1							1.00	12.45	5.97	4.62	6.38
7nc610_190_232	NCU05867.1	1.07		1.17	1.23	1.35	1.48	1.00	1.63	1.45	1.22	1.20
7nc610_280_315	NCU05875.1							1.00	2.05	1.95	1.39	1.51
7nc610_320_1174	NCU05878.1	1.35		1.14	1.19	1.37	1.97	1.00	2.27	1.42	1.23	1.45
7nc610_360_37	NCU05883.1	1.27		1.36	1.40	1.69	2.05	1.00	2.23	1.62	1.48	1.43
7nc610_500_1202	NCU05897.1	1.00		1.16	2.18	5.78	7.66	18.57	1.69	11.00	15.60	14.24
7nc612_040_3925	NCU05902.1	1.02		1.03	1.00	1.08	1.20	1.26	1.13	1.12	1.20	1.20
xnc040_040_1415	NCU05909.1	1.00		1.07	1.13	1.04	1.12	1.35	1.04	1.12	1.13	1.11
xnc040_060_114	NCU05911.1	1.22		1.22	1.34	1.65	2.04	1.00	1.93	1.70	1.57	1.38
xnc040_090_598	NCU05915.1	3.48		2.14	1.53	1.00						
xnc041_030_1820	NCU05918.1	1.11		1.12	1.16	1.08	1.07	1.18	1.13	1.17	1.10	1.00
xnc041_090_848	NCU05924.1	1.00		1.04	1.23	1.13	1.21	1.13	2.05	2.20	1.32	1.13
xnc043_040_1196	NCU05937.1	1.83		1.00	1.20	1.67	1.79	1.68	1.19	1.19	1.23	1.87
xnc043_070_2899	NCU05939.1	1.48		1.15	1.17	1.02	1.00	1.00	1.21	1.07	1.11	1.15
xnc043_080_518	NCU05940.1	1.01		1.37	1.59	1.63	1.50	1.00	2.31	2.40	2.71	2.23
xnc043_110_2961	NCU05943.1	1.00		1.20	1.31	1.61	2.05	1.04	2.44	1.82	1.67	1.86
xnc043_130_1036	NCU05945.1	1.35		1.14	1.10	1.00						
xnc043_140_224	NCU05946.1	1.29		1.14	1.13	1.00						
xnc043_200_227	NCU05951.1	1.00		1.18	1.22	1.45	1.72	1.69	2.75	2.24	1.52	2.01
xnc044_020_1171	NCU05955.1	1.00		1.11	1.19	1.33	1.42	1.04	1.71	1.74	1.36	1.35
xnc044_060_545	NCU05959.1	1.00		1.42	1.25	1.41	1.49	1.44	2.24	2.01	1.96	2.76
xnc044_090_18	NCU05962.1	1.01		1.25	1.19	1.24	1.40	1.00	1.85	1.53	1.54	1.37
xnc044_140_1525	NCU05967.1	1.31		1.31	1.38	1.49	4.73	1.18	1.08	1.00	1.25	1.49
xnc046_020_301	NCU05974.1	6.00		4.37	3.42	2.30	2.23	1.14	2.95	1.55	1.00	1.08
xnc046_100_366	NCU05982.1	1.00		1.08	1.18	1.32	1.43	1.08	1.67	1.32	1.28	1.30
xnc046_120_1201	NCU05984.1	1.15		1.19	1.41	1.63	1.56	1.00	2.26	1.80	1.51	1.46
xnc046_140_714	NCU05986.1	1.25		1.19	1.23	1.00	1.03	1.06	1.10	1.53	1.39	1.24
xnc047_030_226	NCU05989.1	2.83		2.04	2.05	1.95	1.39	1.44	1.00	1.70	1.65	1.39
xnc048_020_279	NCU05991.1	1.33		1.22	1.32	1.29	1.39	1.00	1.69	1.41	1.47	1.26
xnc048_040_2094	NCU05993.1	1.35		1.35	1.27	1.10	1.12	1.03	1.03	1.00	1.00	1.05
xnc048_070_705	NCU05995.1	1.00		1.64	1.67	2.27	2.36	2.12	2.69	2.48	2.66	3.41
xnc048_100_1022	NCU05999.1	1.07		1.01	1.00	1.21	1.41	1.37	1.75	1.55	1.38	1.40

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
xnc048_120_51	NCU06001.1	1.00		1.22	1.32	1.56	1.79	1.47	2.17	2.55	1.49	1.61
xnc048_140_0	NCU06002.1	1.01		1.23	1.38	1.58	1.72	1.25	1.79	1.78	1.00	1.12
xnc048_150_887	NCU06003.1	3.98		2.57	2.33	2.22	1.33	1.75	1.06	1.00	1.27	1.68
xnc048_160_1643	NCU06005.1	1.98		1.10	1.00	3.41	4.13	3.79	14.56	12.12	12.80	15.11
xnc048_190_435	NCU06008.1	1.06		1.06	1.00	1.45	1.77	1.01	2.19	1.57	1.73	1.34
7nc448_010_274	NCU06019.1	1.08		1.09	1.17	1.25	1.40	1.00	1.76	1.58	1.38	1.26
7nc448_030_1102	NCU06020.1	1.17		1.00	1.46	1.47	1.57	1.22	3.63	2.83	1.92	2.32
7nc448_060_72	NCU06023.1	1.00		1.28	1.60	1.91	2.11	1.41	2.50	2.40	2.03	1.70
7nc448_080_747	NCU06025.1	1.03		1.14	1.21	1.35	1.43	1.31	1.08	1.00	1.33	1.48
7nc448_110_2133	NCU06028.1	1.22		1.36	1.34	1.41	1.55	1.00	1.78	1.46	1.27	1.35
7nc448_140_556	NCU06031.1	2.69		1.99	3.39	4.23	3.29	5.27	1.00	3.52	3.62	4.02
7nc448_180_100	NCU06034.1	1.07		1.00	1.15	1.38	1.34	1.22	2.12	2.10	1.31	1.76
7nc448_190_525	NCU06035.1	3.58		3.17	3.23	2.82	2.28	3.41	1.00	2.46	2.46	3.04
7nc448_240_1670	NCU06039.1	1.00		1.12	1.16	1.17	1.33	1.45	1.61	1.39	1.51	1.84
7nc450_030_1478	NCU06042.1	1.00		5.22	3.52	2.72	2.74	3.89	1.14	2.34	2.84	2.15
7nc450_040_888	NCU06043.1	1.00		1.55	1.95	4.32	5.95	2.70	5.78	3.35	4.74	3.54
7nc450_060_497	NCU06047.1	4.15		3.70	3.91	3.13	2.15	2.27	1.00	2.18	2.17	2.17
7nc450_070_95	NCU06048.1	3.49		3.20	3.42	3.20	2.23	2.26	1.00	2.39	2.39	2.91
7nc450_240_67	NCU06066.1	1.00		1.09	1.46	1.73						
7nc450_250_2821	NCU06067.1	1.12		1.42	1.52	1.25	1.24	1.34	1.05	1.00	1.38	1.04
7nc450_330_1469	NCU06075.1	5.45		9.61	6.20	3.93	2.91	5.14	1.00	2.10	2.50	2.36
7nc452_010_89	NCU06076.1	1.09		2.37	1.46	1.17	1.28	1.29	1.00	1.03	1.15	1.27
7nc452_030_28	NCU06078.1	1.00		1.15	1.27	1.26						
7nc452_040_455	NCU06079.1	1.00		2.49	2.12	2.18	3.02	1.37	4.09	3.13	2.76	2.55
7nc455_050_1002	NCU06084.1	1.15		1.22	1.26	1.13	1.15	1.27	1.12	1.00	1.03	1.02
7nc455_070_694	NCU06086.1	1.74		1.53	1.81	1.54	1.39	1.35	1.00	1.50	1.73	2.16
7nc455_080_63	NCU06087.1	1.14		1.25	1.24	1.36	1.55	1.00	1.58	1.56	1.42	1.33
7nc470_050_1216	NCU06099.1	1.34		1.13	1.17	1.51	1.75	1.00	1.51	1.21	1.53	1.31
7nc470_060_623	NCU06101.1	2.41		1.86	2.41	2.03	2.21	2.71	1.00	1.68	1.98	1.91
7nc470_090_825	NCU06104.1	1.16		1.32	1.33	1.27	1.57	1.00	2.07	1.81	1.49	1.78
7nc470_120_66	NCU06107.1	1.23		1.00	1.18	1.40	1.34	1.21	1.83	2.58	2.16	2.22
7nc470_150_806	NCU06110.1							44.57	1.00	14.25	15.74	6.92
7nc470_220_1831	NCU06118.1	1.30		1.30	1.40	1.42	1.50	1.00	2.06	1.43	1.59	1.51
7nc470_240_235	NCU06120.1	2.17		2.59	2.35	3.31	3.76	6.03	1.00	2.39	3.50	3.89
7nc470_270_2401	NCU06123.1	1.00		1.16	1.16	1.15	1.14	1.51	1.43	1.57	1.54	1.27
7nc470_290_546	NCU06125.1	1.00		1.06	1.15	1.57	1.60	1.36	5.45	3.04	2.60	2.84
7nc470_360_1302	NCU06132.1	1.03		2.04	1.98	1.53	1.27	1.25	1.00	1.26	1.39	1.04
7nc470_390_449	NCU06135.1	1.00		1.14	1.09	1.07	1.11	1.20	1.21	1.28	1.34	1.40
7nc470_410_582	NCU06137.1	1.32		2.29	2.91	2.93	3.65	3.99	1.00	3.02	3.22	2.83
7nc470_450_1327	NCU06141.1	1.67		1.78	1.67	1.77	1.95	1.29	1.00	1.70	1.62	2.27
7nc470_460_257	NCU06142.1	1.02		1.36	1.56	1.91	2.13	1.00	3.94	2.43	2.32	2.46
7nc470_470_3103	NCU06143.1	1.00		1.07	1.06	1.08	1.35	1.91	1.07	1.52	1.60	1.32
7nc470_500_2096	NCU06146.1	1.10		1.26	1.26	1.11	1.09	1.20	1.13	1.11	1.10	1.00
7nc470_560_1360	NCU06153.1	1.62		1.00	1.08	2.24	2.45	2.16	5.07	3.46	3.65	4.29
3nc295_020_1751	NCU06173.1	1.00		1.01	1.09	1.42	1.69	1.00	1.85	1.33	1.22	1.44
NCU06174.1_450	NCU06174.1	1.00		1.27	1.24	1.96	2.82	1.30	2.72	2.33	2.19	2.42
NCU06175.1_1734	NCU06175.1							1.09	1.12	1.00	1.04	1.03
3nc300_030_1086	NCU06179.1	1.05		1.07	1.14	1.03	1.17	1.27	1.85	1.09	1.00	1.02
3nc300_080_285	NCU06185.1	2.12		2.16	2.13	1.97	2.05	1.18	1.56	1.27	1.21	1.00
3nc300_100_1338	NCU06187.1	6.67		5.52	4.55	4.36	3.89	4.93	1.00	4.08	4.49	4.20
3nc305_030_1025	NCU06200.1	1.08		1.17	1.26	1.40	1.64	1.00	1.89	1.53	1.31	1.37
3nc305_040_118	NCU06201.1	1.00		1.30	1.41	1.57	1.65	1.78	1.12	1.37	1.45	1.20
3nc305_060_661	NCU06203.1	1.00		1.70	1.96	2.70	2.76	3.63	2.62	2.28	3.13	3.02
3nc305_100_387	NCU06207.1	1.41		4.01	3.34	2.42	2.17	2.41	1.00	1.37	1.37	1.22
3nc305_120_86	NCU06210.1	5.27		4.28	4.59	3.34	2.22	2.12	1.00	2.36	2.50	2.67
3nc305_130_280	NCU06211.1	1.02		1.00	1.34	1.83	2.16	2.16	1.09	2.09	2.05	1.86
3nc305_160_262	NCU06214.1	2.17		2.15	1.84	1.82	1.58	1.32	1.00	1.51	1.69	1.98
3nc310_020_624	NCU06221.1	1.00		1.28	1.48	1.53	1.40	1.52	1.57	1.65	1.37	1.53
3nc310_050_195	NCU06224.1	1.00		1.01	1.22	1.56	1.53	1.29	1.38	1.40	1.45	1.82
3nc310_080_151	NCU06226.1	6.27		5.27	5.45	4.39	2.59	2.40	1.00	2.88	2.82	2.70
3nc310_090_628	NCU06227.1	1.00		1.25	1.40	1.77	1.97	1.40	2.55	1.61	1.59	1.92
3nc310_120_1827	NCU06230.1	1.00		3.52	3.08	3.27	3.87	6.52	2.13	2.91	3.60	4.44
3nc310_140_988	NCU06232.1	5.46		4.17	7.54	6.78	5.76	7.35	1.00	4.67	4.43	3.48
3nc310_190_363	NCU06237.1	1.00		1.14	1.09	1.67	2.39	1.08	2.53	1.80	1.52	1.56
3nc310_220_320	NCU06240.1	1.34		1.25	1.36	1.63	1.83	1.00	2.40	1.68	1.70	1.64
3nc310_250_190	NCU06244.1	1.37		1.22	1.20	1.17	1.00	1.05	2.14	2.26	1.67	1.80
3nc310_260_1661	NCU06245.1	1.00		1.08	1.19	1.38						
3nc310_270_885	NCU06246.1	1.04		1.00	1.19	1.66	1.87	1.04	1.04	1.20	1.68	1.49
3nc310_280_3890	NCU06247.1	1.27		1.24	1.66	1.86	1.63	2.20	1.00	1.20	1.58	2.10
3nc310_300_3525	NCU06249.1	1.25		1.00	1.15	1.68	1.90	1.89	1.13	1.14	1.53	2.36
3nc315_010_1900	NCU06252.1	1.63		1.02	1.15	1.59	1.95	1.00	2.18	1.83	1.53	1.70
3nc315_030_689	NCU06254.1	1.24		1.31	1.28	1.32	1.34	1.29	1.00	1.21	1.68	1.61

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
3nc315_040_1388	NCU06255.1	1.45		1.25	1.03	1.74	3.42	1.00	4.66	2.21	2.38	3.00
3nc315_070_2237	NCU06257.1	1.13		1.26	1.33	1.43	1.71	1.00	1.93	1.55	1.41	1.38
3nc315_100_1057	NCU06260.1	1.00		1.11	1.10	1.03	1.22	1.11	1.33	1.23	1.43	1.46
3nc315_110_176	NCU06261.1	1.00		1.12	1.73	4.48						
3nc315_150_2343	NCU06265.1	1.35		1.06	1.00	1.01	1.49	1.14	4.32	3.79	2.76	3.07
3nc320_020_1056	NCU06266.1	1.25		1.21	1.31	1.44	1.70	1.00	1.92	1.64	1.54	1.38
3nc320_030_507	NCU06267.1	1.00		1.10	1.08	1.11	1.20	1.37	1.08	1.19	1.29	1.32
3nc320_040_2305	NCU06268.1	1.00		1.11	1.27	2.30						
3nc320_050_1847	NCU06269.1	1.20		1.29	1.45	1.56	1.44	1.00	1.91	1.42	1.45	1.52
3nc320_120_2053	NCU06277.1	1.21		1.00	1.10	1.38	1.32	1.12	1.58	1.11	1.27	1.59
3nc320_140_753	NCU06279.1							1.05	1.17	1.00	1.02	1.02
4nc618_010_4247	NCU06281.1	1.03		1.00	1.07	1.04	1.16	1.24	1.44	1.42	1.26	1.40
4nc620_030_2569	NCU06285.1	1.00		1.10	1.40	1.83	2.06	1.25	1.64	1.63	1.89	1.82
4nc620_080_951	NCU06290.1	1.23		1.31	1.26	1.45	1.74	1.00	1.94	1.67	1.59	1.53
4nc620_160_78	NCU06300.1	1.43		1.43	1.73	1.95	1.89	1.16	1.16	1.05	1.00	1.12
4nc620_170_88	NCU06301.1	3.47		3.85	4.77	4.77	4.33	4.35	1.28	1.99	1.65	1.00
4nc620_210_1157	NCU06305.1	1.45		4.97	5.62	6.29	5.59	8.96	1.00	5.12	5.59	4.06
4nc620_230_1160	NCU06307.1	1.24		1.37	1.54	1.58	1.35	1.77	1.00	1.53	1.62	1.43
4nc620_300_311	NCU06314.1	1.40		1.40	1.50	1.50	1.57	1.00	1.55	1.40	1.42	1.45
4nc620_330_123	NCU06317.1	1.00		1.46	1.34	1.36	1.48	1.17	1.17	1.07	1.24	1.28
4nc620_380_621	NCU06322.1	1.00		1.04	1.07	1.00	1.04	1.17	1.10	1.07	1.09	1.08
4nc620_390_74	NCU06323.1	7.90		11.52	5.06	3.39	2.64	4.94	1.00	3.63	4.44	4.48
4nc620_430_1454	NCU06327.1	12.56		4.28	3.94	4.18	2.87	4.27	1.00	2.50	5.12	4.49
4nc620_450_3352	NCU06329.1	1.25		1.24	1.34	1.31	1.48	1.00	2.21	2.11	1.66	1.70
4nc620_490_934	NCU06333.1	1.01		1.00	1.34	1.38	1.51	1.26	1.97	1.76	1.41	1.36
4nc620_500_1948	NCU06334.1							1.00	7.58	5.09	9.51	5.67
4nc625_010_240	NCU06335.1	1.02		1.07	1.14	1.44	1.91	1.00	1.89	1.60	1.64	1.79
4nc625_050_1398	NCU06339.1	1.05		1.14	1.21	1.45	1.76	1.00	2.02	1.70	1.58	1.58
4nc625_120_27	NCU06346.1	1.54		1.21	1.62	2.97	2.70	2.63	1.00	2.06	1.94	2.87
4nc625_130_561	NCU06347.1	1.19		1.39	1.53	1.64	1.70	1.00	1.76	1.43	1.37	1.34
4nc625_190_484	NCU06353.1	1.00		1.35	1.36	1.50	1.51	1.14	1.79	2.18	1.87	2.09
4nc625_200_42	NCU06354.1	1.23		1.37	1.48	1.89	1.94	1.00	2.82	1.95	1.89	1.91
4nc625_220_1616	NCU06358.1	1.04		1.06	1.00	1.20	1.33	1.61	1.19	1.23	1.34	1.35
4nc625_240_991	NCU06360.1	2.38		5.42	5.46	4.26	5.06	5.92	1.00	3.45	3.26	2.35
4nc625_260_2802	NCU06362.1	1.47		1.40	1.41	1.68	1.74	1.00	2.14	1.57	1.50	1.41
4nc625_320_433	NCU06368.1	1.02		1.17	1.19	1.76	1.72	1.00	2.12	1.84	1.55	1.59
4nc625_400_1521	NCU06376.1	1.00		1.43	1.45	1.41	1.69	1.57	1.11	1.23	1.22	1.21
4nc630_030_3844	NCU06382.1	1.33		1.33	1.38	1.53	1.69	1.00	1.98	1.60	1.53	1.47
4nc630_170_346	NCU06396.1	1.00		1.02	1.01	1.19	1.28	1.43	1.22	1.20	1.35	1.33
4nc630_180_158	NCU06397.1	1.97		1.40	1.72	2.54	2.23	1.86	1.00	1.34	1.46	1.56
4nc630_230_431	NCU06402.1	2.03		8.27	7.57	3.81	3.27	3.55	1.00	2.05	2.23	1.65
3nc213_010_429	NCU06405.1	1.20		1.14	1.13	1.36	1.87	1.00	2.19	1.75	1.75	1.56
3nc215_020_3219	NCU06407.1	1.00		1.18	1.25	1.41						
3nc215_040_498	NCU06410.1	1.00		1.44	1.41	1.40	1.35	1.26	1.37	1.95	1.74	1.58
3nc215_080_1782	NCU06414.1	1.00		1.18	1.56	1.86	1.86	1.30	1.84	2.22	1.69	1.59
3nc220_020_920	NCU06416.1	2.01		2.62	2.46	2.66	2.53	3.06	1.00	1.94	1.87	1.83
3nc220_030_888	NCU06417.1	1.23		1.39	1.33	1.40	1.36	1.45	1.00	1.07	1.21	1.17
3nc220_040_1327	NCU06418.1	1.26		1.39	1.44	1.49	3.14	1.00	2.61	1.77	1.72	1.53
3nc220_130_746	NCU06425.1	1.41		1.00	1.08	1.69	2.29	1.18	2.59	1.50	1.55	1.79
3nc220_140_149	NCU06426.1	1.02		1.21	1.22	1.27	1.49	1.00	1.47	1.24	1.02	1.19
3nc220_190_323	NCU06431.1	4.96		4.04	3.92	3.35	2.08	2.38	1.00	2.47	2.60	2.58
3nc220_200_219	NCU06432.1	7.61		6.03	6.31	4.81	2.85	3.01	1.00	3.58	3.71	3.86
3nc220_240_1734	NCU06436.1	1.00		1.55	1.25	1.38	2.04	1.41	1.79	1.43	1.49	1.76
3nc220_340_125	NCU06447.1	1.22		1.00	1.07	1.38	1.39	1.05	2.01	1.64	1.29	1.33
3nc220_380_1115	NCU06451.1	1.24		1.16	1.19	1.03	1.07	1.11	1.03	1.00	1.03	1.10
3nc220_390_1025	NCU06452.1	1.10		1.16	1.30	1.25	1.17	1.29	1.00	1.21	1.24	1.27
3nc220_480_1412	NCU06460.1	1.00		1.13	1.30	1.33	1.41	1.21	1.61	1.37	1.45	1.47
3nc220_520_185	NCU06464.1	4.82		4.37	4.30	4.19	3.09	3.45	1.00	2.81	2.81	2.81
3nc220_530_658	NCU06465.1	1.05		4.67	2.83	2.36	2.65	2.20	1.00	1.47	1.73	1.53
3nc220_610_321	NCU06474.1	1.32		1.35	1.32	1.53	1.63	1.00	2.10	1.66	1.65	1.53
3nc225_010_693	NCU06478.1	1.00		1.86	1.41	2.40	2.15	1.48	1.86	2.50	2.53	2.43
3nc225_050_605	NCU06482.1	3.30		2.23	2.74	1.88	1.41	1.33	1.00	1.53	1.68	1.81
3nc225_110_4324	NCU06488.1							1.00	1.86	1.22	1.44	1.79
3nc225_180_205	NCU06495.1	2.61		2.01	2.14	2.40	1.99	1.78	1.00	1.62	1.63	1.50
3nc225_220_2425	NCU06499.1	1.00		1.47	1.64	2.78	3.99	1.61	4.92	3.36	2.96	2.58
3nc225_270_621	NCU06505.1	1.00		1.11	1.14	1.31	1.28	1.18	3.12	1.83	1.76	2.00
3nc225_280_480	NCU06506.1	1.49		1.26	1.30	1.36	1.40	1.00	2.37	1.90	1.81	1.80
3nc225_310_71	NCU06509.1	2.37		1.57	1.26	1.00						
3nc225_330_858	NCU06512.1	7.17		3.58	5.30	7.35	5.45	3.32	1.00	1.67	1.47	1.17
4nc305_030_1	NCU06517.1	1.09		1.50	1.26	1.60	1.96	1.00	2.90	2.33	2.07	2.11
4nc310_020_185	NCU06524.1	1.00		1.34	1.37	2.07	2.94	3.62	1.06	3.16	3.39	3.20
4nc310_030_864	NCU06525.1	1.32		1.34	1.22	1.46	1.37	1.00	1.92	1.40	1.48	1.38
NCU06527.1_63	NCU06527.1	1.52		1.27	1.33	1.30	1.15	1.12	1.19	1.23	1.00	1.67

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc310_090_1456	NCU06531.1						1.25	1.00	1.22	1.17	1.09
4nc310_100_1337	NCU06532.1	4.74		8.44	8.34	6.31 5.56	8.81	1.00	3.93	5.86	4.43
4nc320_010_2179	NCU06536.1	1.43		2.40	1.83	2.66 2.91	1.00	5.14	3.10	2.42	4.62
4nc320_130_253	NCU06549.1	2.01		2.22	1.84	1.00					
4nc320_140_825	NCU06550.1	22.07		21.17	18.91	16.19 12.03	16.33	1.00	6.82	8.54	2.90
4nc320_200_30	NCU06556.1	4.57		3.20	3.31	4.37 3.34	4.57	1.00	3.72	3.73	4.93
4nc320_250_401	NCU06561.1	1.27		1.00	1.33	1.61					
NCU06562.1_181	NCU06562.1	1.27		1.00	1.27	1.72 1.43	1.09	1.26	1.33	1.21	1.15
4nc322_020_344	NCU06572.1	1.00		1.19	1.32	1.35 1.67	1.14	2.38	2.33	1.27	1.24
4nc325_160_262	NCU06588.1	1.67		1.64	1.74	2.21 1.79	1.33	1.00	1.46	1.42	1.47
4nc330_090_160	NCU06597.1	1.00		1.17	1.24	4.51 3.35	2.03	29.62	23.64	19.58	20.54
4nc330_150_29	NCU06603.1	1.19		1.00	1.39	2.69 4.47	2.16	12.13	12.68	11.31	11.70
4nc330_180_561	NCU06606.1	2.19		1.90	1.90	1.89 1.55	1.69	1.00	1.53	1.61	1.36
4nc330_190_885	NCU06607.1	1.00		2.15	2.03	1.43					
4nc330_290_243	NCU06617.1	1.13		1.00	1.09	1.64 2.33	1.20	2.51	1.63	1.58	1.94
4nc330_310_847	NCU06619.1	1.95		3.26	2.80	1.64 1.13	1.00	1.24	1.51	1.16	1.38
4nc335_040_910	NCU06630.1	1.30		1.00	1.16	1.43 1.38	1.41	1.23	1.07	1.87	1.83
NCU06636.1_380	NCU06636.1	1.28		1.25	1.36	1.49 1.99	1.00	2.23	1.66	1.65	1.39
18a7_020_147	NCU06640.1	1.02		1.11	1.22	1.23 1.70	1.00	1.95	1.45	1.39	1.33
18a7_030_202	NCU06643.1	1.00		1.00	1.11	1.76 2.34	1.41	2.55	1.73	1.56	1.58
18a7_080_1635	NCU06648.1	1.12		1.00	1.54	1.90 2.13	1.02	2.41	1.73	1.59	2.13
18a7_090_2588	NCU06649.1	1.21		1.25	1.30	1.49 1.67	1.00	1.96	1.42	1.43	1.51
18a7_110_33	NCU06651.1	1.00		1.93	1.67	2.05 2.51	1.42	2.86	2.46	1.88	2.05
18a7_120_1071	NCU06652.1	1.29		1.29	1.67	2.29 2.26	2.99	1.00	2.51	2.65	3.11
18a7_130_168	NCU06653.1	1.11		1.00	1.11	1.64 2.03	1.40	2.18	2.47	1.75	1.87
18a7_170_2443	NCU06656.1	1.00		1.43	1.15	1.72 1.85	2.00	1.37	1.61	1.60	2.60
18a7_180_274	NCU06657.1	1.00		1.13	1.09	1.32 1.36	1.69	1.45	1.13	1.43	1.60
100h1_040_84	NCU06660.1	3.19		2.20	1.00	1.91 2.37	1.34	3.68	2.97	2.83	4.11
100h1_050_198	NCU06661.1	8.97		6.79	7.10	5.01 2.92	3.10	1.00	2.92	3.26	3.26
100h1_120_1522	NCU06666.1	3.28		5.39	9.49	9.24 3.53	1.61	2.28	1.61	1.00	1.68
7f4_030_217	NCU06682.1	1.00		1.63	1.47	2.01					
7f4_080_1743	NCU06687.1	3.94		3.02	4.48	5.21 3.85	4.21	1.00	2.01	2.83	3.31
7f4_090_1734	NCU06688.1						1.00	2.29	1.92	1.50	1.99
7f4_140_174	NCU06695.1	2.18		1.94	2.37	2.67 1.98	1.62	1.00	1.70	1.61	1.50
7f4_180_1978	NCU06698.1	11.33		10.73	9.21	8.19 6.34	8.57	1.00	4.68	5.39	6.61
7f4_210_643	NCU06700.1	1.00		1.27	1.18	1.28 1.98	1.43	2.06	1.90	1.78	1.87
7f4_370_2744	NCU06714.1	1.52		1.66	1.59	1.29 1.23	1.19	1.00	1.21	1.19	1.10
b11h7_040_69	NCU06719.1	1.16		1.46	1.43	1.48 1.44	1.06	1.12	1.09	1.08	1.00
b11h7_090_394	NCU06724.1	4.06		1.68	1.64	1.70 1.25	1.00	1.70	1.61	1.00	1.22
b11h7_120_791	NCU06727.1	1.41		1.29	1.23	1.18 1.13	1.00	1.63	1.36	1.54	1.52
5nc570_020_5062	NCU06733.1	1.36		1.33	1.41	1.46 1.48	1.00	1.48	1.22	1.24	1.23
b24n11_260_2599	NCU06734.1	1.14		1.20	1.27	1.45 1.43	1.00	2.06	1.82	1.66	1.65
b24n11_240_2011	NCU06737.1	3.52		3.14	3.11	2.95 2.57	3.20	1.00	1.35	1.78	1.77
b24n11_230_3623	NCU06738.1	1.04		1.00	1.32	1.84 1.79	1.49	1.62	1.07	1.15	1.50
b24n11_210_76	NCU06740.1	1.77		1.83	1.68	1.76 1.56	1.46	1.00	1.50	1.57	1.57
b24n11_200_146	NCU06741.1	1.70		1.43	1.54	1.85 1.46	1.35	1.00	1.51	1.43	1.27
b24n11_170_573	NCU06743.1	1.00		1.13	1.16	1.19 1.27	1.28	1.16	1.09	1.12	1.09
b24n11_180_58	NCU06743.1	6.77		4.97	5.46	4.31 2.79	2.55	1.00	2.91	3.03	2.83
b24n11_160_177	NCU06744.1	1.10		1.21	1.19	1.40 1.38	1.00	1.61	1.31	1.27	1.26
b24n11_140_915	NCU06746.1	1.00		1.09	1.12	1.18 1.21	1.25	1.02	1.21	1.17	1.21
b24n11_110_189	NCU06749.1	2.17		1.73	1.43	1.00					
b24n11_080_2161	NCU06752.1	1.81		1.13	1.07	1.00					
b24n11_030_1623	NCU06757.1	1.07		1.07	1.00	1.05 1.01	1.32	2.41	2.32	1.83	1.86
b14d6_540_1587	NCU06761.1	1.30		1.64	1.55	1.41 1.53	2.16	1.00	1.45	1.90	1.84
b14d6_510_327	NCU06764.1	1.20		1.26	1.45	1.55 1.65	1.00	1.50	1.48	1.14	1.29
b14d6_370_756	NCU06778.1	1.20		1.22	1.31	1.62 2.12	1.00	2.45	1.84	1.76	1.51
b14d6_360_1594	NCU06779.1	1.07		1.09	1.00	1.15 1.29	1.27	1.04	1.10	1.13	1.34
b14d6_320_1106	NCU06783.1	3.67		1.50	2.50	2.74 2.26	2.10	1.00	1.66	1.65	1.28
b14d6_310_1767	NCU06785.1	4.06		1.00	2.25	2.21					
b14d6_300_240	NCU06786.1	1.25		1.15	1.24	1.10 1.09	1.03	1.00	1.09	1.09	1.05
b14d6_260_642	NCU06790.1	1.16		1.00	1.27	1.45					
NCU06802.1_186	NCU06802.1	1.02		1.23	1.52	1.72 1.89	1.72	2.76	2.76	1.00	1.24
b14d6_170_1183	NCU06803.1						1.00	3.90	2.56	1.54	1.81
NCU06805.1_332	NCU06805.1	1.00		1.11	1.22	1.49 1.45	1.20	1.13	1.38	1.33	1.41
b14d6_130_2118	NCU06809.1	1.00		1.20	1.13	1.17 1.32	1.46	1.55	1.47	1.35	1.33
b14d6_070_239	NCU06817.1	1.02		1.08	1.22	1.49 1.56	1.00	2.02	1.96	1.47	1.52
b14d6_020_734	NCU06826.1						1.00	2.32	1.61	1.61	1.43
b23d6_090_2583	NCU06834.1	1.14		1.18	1.32	1.38 1.45	1.00	1.22	1.25	1.19	1.35
b23d6_080_109	NCU06835.1	1.00		1.48	1.46	1.95 1.74	1.28	1.78	1.97	1.39	1.56
b23d6_070_975	NCU06836.1	1.33		1.96	2.34	1.97 2.01	2.14	1.17	2.17	1.88	1.00

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b17b1_040_475	NCU06843.1	8.11		5.95	7.16	4.09	2.80	2.78	1.00	2.66	3.12	2.80
xnc060_060_162	NCU06863.1	1.25		1.06	1.17	1.20	1.51	1.00	1.01	1.06	1.03	1.13
xnc061_010_1399	NCU06864.1	1.10		1.13	1.22	1.36	1.50	1.00	1.54	1.48	1.22	1.24
xnc063_030_5793	NCU06871.1	2.54		1.09	1.00	1.06	1.36	1.42	3.77	1.86	1.38	1.41
xnc064_020_285	NCU06875.1	1.00		2.20	1.42	1.62	1.86	1.17	1.63	1.65	1.68	1.76
xnc064_030_83	NCU06876.1	1.04		1.25	1.25	1.63	1.48	1.32	1.00	1.11	1.22	1.25
xnc064_040_1825	NCU06877.1	1.12		1.15	1.15	1.00	1.12	1.17	1.58	1.30	1.30	1.29
xnc064_070_383	NCU06880.1	1.50		1.08	1.61	2.16	1.77	1.30	1.00	1.38	1.36	1.63
xnc064_200_249	NCU06892.1	4.66		3.28	3.32	2.85	1.78	1.98	1.00	2.02	2.23	2.22
xnc064_230_1014	NCU06895.1	1.00		2.11	2.16	2.93	4.04	1.54	5.20	4.79	5.14	5.74
xnc064_250_419	NCU06897.1	1.22		1.25	1.39	1.41	1.42	1.00	1.32	1.22	1.29	1.24
xnc064_280_311	NCU06901.1	1.15		1.21	1.28	1.28	1.31	1.00	1.54	1.19	1.14	1.24
xnc064_440_980	NCU06915.1	1.00		1.07	1.07	1.08	1.13	1.22	1.15	1.07	1.07	1.06
xnc064_480_557	NCU06919.1	2.12		1.75	2.49	2.70	3.40	3.93	1.00	1.43	3.23	3.05
xnc064_530_697	NCU06924.1	1.29		1.38	1.35	1.52	1.81	1.00	2.33	1.83	1.78	1.39
xnc067_020_1552	NCU06939.1	1.15		1.34	1.33	1.61	1.93	1.00	2.24	1.79	1.76	1.52
xnc067_030_536	NCU06940.1	10.92		17.7	10.1	6.78	6.00	8.75	1.00	7.19	11.02	4.40
				7	5							
xnc068_080_206	NCU06953.1	3.53		3.57	3.26	2.95	3.12	6.28	1.00	2.12	3.70	2.50
xnc068_090_207	NCU06954.1	1.00		1.42	1.75	1.49						
4nc570_020_49	NCU06958.1							1.00	1.33	1.09	1.11	1.01
4nc570_140_339	NCU06968.1	1.44		1.08	1.27	1.74	2.06	1.00	2.55	1.86	1.69	1.74
4nc570_170_1911	NCU06971.1	1.00		1.11	1.27	1.59	1.58	1.16	2.08	1.78	1.21	1.42
4nc570_200_1172	NCU06975.1	1.31		1.23	1.31	1.47	1.73	1.00	2.38	1.86	1.79	1.46
4nc570_210_12674	NCU06976.1	1.41		1.00	1.17	1.67	2.30	1.11	2.14	1.63	1.64	1.97
4nc570_220_423	NCU06977.1	1.00		1.02	1.68	2.04	2.81	3.40	5.25	4.55	4.82	6.88
4nc570_240_424	NCU06979.1	1.09		1.06	1.14	1.51	1.70	1.00	1.61	1.50	1.42	1.48
4nc570_280_4671	NCU06984.1	3.48		2.84	2.55	2.36	1.81	1.72	1.00	1.94	2.60	2.18
4nc570_300_2626	NCU06986.1	2.40		1.00	1.02	1.05	1.37	1.00	2.00	1.42	1.36	1.32
4nc570_330_1448	NCU06989.1	2.03		1.41	1.15	1.04	1.00	1.33	1.33	1.55	2.11	3.49
4nc570_340_2364	NCU06990.1	1.02		1.00	1.05	1.11	1.13	1.10	1.29	1.20	1.22	1.33
4nc570_360_818	NCU06992.1	3.75		2.90	3.27	2.62	2.12	1.98	1.00	1.63	2.30	3.22
4nc570_380_1028	NCU06994.1	1.30		1.20	1.17	1.44	1.80	1.00	2.15	1.84	1.77	1.73
4nc570_390_679	NCU06995.1	1.21		1.26	1.37	1.67	1.69	1.00	1.83	1.90	1.26	1.28
4nc570_430_3464	NCU06999.1	1.01		1.28	1.00	1.09	1.23	1.10	1.89	1.43	1.31	1.40
4nc570_440_878	NCU07000.1	1.17		1.23	1.32	1.37	1.52	1.00	1.73	1.56	1.48	1.38
4nc570_450_1407	NCU07001.1	1.83		1.41	1.48	1.40	1.52	1.58	1.00	1.29	1.42	1.26
4nc578_020_2103	NCU07011.1	1.25		1.20	1.27	1.53	2.09	1.00	3.03	2.27	2.09	1.97
4nc578_030_2641	NCU07012.1	1.00		1.10	1.26	1.40	1.68	1.14	2.41	1.90	1.48	1.50
4nc578_050_51	NCU07014.1	6.95		4.96	5.86	4.75	3.07	3.21	1.00	3.06	3.50	3.60
4nc578_060_483	NCU07015.1	1.76		1.73	1.68	1.82	1.75	1.00	1.55	1.60	1.59	1.56
4nc578_090_546	NCU07017.1	3.27		2.07	1.51	1.00						
4nc580_040_2506	NCU07023.1	1.33		1.39	1.33	1.46	1.57	1.00	1.77	1.39	1.45	1.47
4nc580_050_825	NCU07024.1	1.85		1.00	1.27	1.65	1.59	1.22	2.26	1.27	1.36	1.54
4nc580_060_1958	NCU07027.1	2.26		4.62	5.82	4.53	3.72	6.33	1.00	3.07	3.60	3.03
4nc580_080_1762	NCU07030.1	1.00		1.28	1.09	1.03	1.30	1.25	1.41	1.25	1.32	1.30
4nc580_210_430	NCU07043.1	1.00		1.08	1.25	1.39	1.41	1.01	1.74	1.56	1.40	1.35
4nc580_220_636	NCU07044.1	1.16		1.27	1.17	1.40	1.59	1.00	1.30	1.15	1.20	1.01
NCU07049.1_673	NCU07049.1	1.15		1.26	1.06	1.49	1.40	1.69	1.00	1.29	1.42	1.26
6nc098_080_76	NCU07061.1	1.16		1.18	1.20	1.34	1.71	1.00	2.04	1.52	1.40	1.29
6nc100_050_1299	NCU07065.1	1.05		1.02	1.00	1.04	1.12	1.09	2.55	1.66	1.19	1.20
6nc100_070_1748	NCU07067.1	1.00		1.00	1.01	1.20	1.60	1.22	2.97	1.56	1.58	1.62
6nc100_100_496	NCU07069.1	1.71		1.33	1.44	1.37	1.46	1.14	1.25	1.00	1.24	1.17
6nc100_150_227	NCU07074.1	1.07		1.17	1.22	1.57	2.00	1.00	1.91	1.60	1.66	1.80
6nc100_160_1450	NCU07075.1	2.55		1.13	1.01	1.02	1.00	1.18	2.68	2.65	2.04	2.24
6nc100_230_2652	NCU07082.1	1.04		1.00	1.21	1.27	1.35	1.23	2.83	2.33	1.39	2.15
6nc100_280_906	NCU07086.1	1.14		1.23	1.38	1.51	1.80	1.00	2.22	1.79	1.61	1.43
6nc105_030_57	NCU07091.1	1.00		1.38	1.55	1.81	1.64	1.23	1.27	1.13	1.35	1.32
6nc105_070_143	NCU07097.1							1.00	2.38	1.78	1.44	1.33
6nc105_080_136	NCU07098.1	1.99		3.55	1.77	1.37	1.39	1.34	1.00	1.15	1.37	1.29
6nc105_120_577	NCU07102.1	1.01		1.20	1.00	1.02	1.17	1.26	1.99	1.35	1.36	1.30
6nc105_180_383	NCU07107.1	1.18		1.24	1.30	1.87	2.04	1.00	1.87	1.56	1.86	1.74
6nc105_220_1497	NCU07110.1	1.07		1.52	1.23	1.19	1.26	1.52	1.00	1.09	1.12	1.10
6nc105_240_1193	NCU07112.1	1.56		1.66	1.57	1.68	1.61	1.81	1.00	1.30	1.30	1.40
6nc110_010_434	NCU07117.1	1.00		3.63	4.22	3.41						
6nc110_060_1736	NCU07123.1	1.00		2.01	1.55	1.72						
6nc110_120_1023	NCU07130.1	1.00		1.15	1.23	1.15	1.23	1.13	1.46	1.98	1.44	1.31
6nc110_130_2387	NCU07131.1	1.60		1.09	1.22	1.29	1.51	1.00	1.14	1.05	1.14	1.15
6nc110_150_494	NCU07133.1							1.00	2.14	1.08	1.04	1.38
6nc110_260_73	NCU07142.1	1.16		1.12	1.26	1.44	1.62	1.00	1.80	1.68	1.55	1.65
NCU07143.1_1026	NCU07143.1	1.00		5.60	3.38	3.17						
103e1_040_1260	NCU07150.1	1.00		1.24	1.33	1.55						
103e1_050_146	NCU07151.1	1.00		1.08	1.13	1.30	1.36	1.37	1.54	1.10	1.36	1.54
103e1_070_1211	NCU07153.1	1.47		1.36	1.76	2.03	2.06	2.43	1.00	1.95	2.01	4.01

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
103e1_090_691	NCU07155.1	1.10		1.34	1.52	1.17	1.20	1.20	1.28	1.20	1.17	1.00
103e1_100_365	NCU07156.1	1.25		1.49	1.39	1.39	1.45	1.00	1.24	1.35	1.28	1.33
103e1_120_1549	NCU07158.1	1.00		1.11	1.02	1.15	1.44	1.34	1.56	1.27	1.47	1.58
103e1_150_232	NCU07163.1	1.63		1.51	1.61	1.41	1.48	1.00	1.37	1.16	1.15	1.07
103e1_190_866	NCU07167.1							1.51	1.00	1.34	1.25	1.25
b8g12_490_1102	NCU07175.1	1.83		1.89	2.72	2.61	2.32	2.49	1.00	2.52	2.61	2.63
b8g12_470_287	NCU07177.1	1.38		1.18	1.00	1.07	2.32	1.24	2.65	2.11	1.93	1.96
b8g12_400_68	NCU07182.1	6.27		5.29	5.48	4.25	2.81	3.16	1.00	2.94	3.35	3.43
b8g12_330_87	NCU07189.1	1.26		1.60	1.48	1.90	1.96	1.00	2.70	2.04	1.82	1.71
b8g12_300_1200	NCU07192.1	2.07		2.21	1.49	1.43	1.43	1.10	1.00	1.01	1.00	1.06
b8g12_280_155	NCU07194.1	1.00		1.11	1.07	1.32	1.38	1.22	1.03	1.13	1.39	1.39
b8g12_250_311	NCU07197.1	1.32		1.29	1.45	1.43	2.34	2.87	1.00	1.95	2.42	2.60
b8g12_180_443	NCU07204.1	1.09		1.16	1.22	1.37	1.75	1.00	1.99	1.62	1.55	1.31
b8g12_170_1438	NCU07205.1	1.06		1.43	1.19	1.00	1.05	1.17	1.02	1.03	1.05	1.03
b8g12_110_7	NCU07213.1	1.06		1.09	1.08	1.02	1.11	1.30	1.09	1.12	1.17	1.00
b8g12_100_1446	NCU07214.1	1.30		1.43	1.51	1.86	2.44	1.00	3.28	2.37	2.23	2.05
b8g12_090_337	NCU07215.1	1.13		1.19	1.23	1.51	1.87	1.00	2.47	1.85	1.70	1.70
b8g12_080_267	NCU07216.1	1.25		1.01	1.05	1.00						
b8g12_030_301	NCU07222.1	1.16		1.19	1.23	1.48	1.87	1.00	2.71	2.05	1.95	1.72
b8g12_010_264	NCU07225.1	1.12		1.06	1.06	1.12	1.31	1.00	1.52	1.30	1.29	1.26
5nc848_020_1143	NCU07238.1	1.31		1.63	1.27	1.00	1.06	1.27	1.02	1.18	1.42	1.85
5nc848_060_341	NCU07242.1	1.08		1.00	1.08	1.46	1.69	1.20	2.18	1.99	2.03	1.57
5nc850_030_1163	NCU07247.1	1.00		1.09	1.25	1.44	1.50	1.60	1.51	1.48	1.70	1.74
4nc600_020_726	NCU07253.1	2.77		2.08	1.55	2.40	1.99	1.00	7.35	3.28	2.19	3.29
4nc600_070_493	NCU07257.1	1.00		5.07	3.71	2.01						
4nc600_100_2313	NCU07260.1	1.29		1.25	1.21	1.35	1.66	1.00	2.19	1.53	1.58	1.58
4nc600_110_457	NCU07261.1	1.09		1.10	1.19	1.35	1.37	1.00	1.44	1.14	1.14	1.09
4nc600_130_951	NCU07263.1	1.09		1.00	1.11	1.33	1.53	1.68	1.47	1.70	1.70	1.46
4nc600_140_206	NCU07264.1	1.09		1.09	1.20	1.35	1.36	1.00	1.29	1.26	1.19	1.40
4nc600_170_127	NCU07267.1	1.00		1.08	1.96	6.52	5.54	1.86	5.38	7.17	7.12	10.88
4nc600_190_1706	NCU07269.1	1.17		1.34	1.49	1.82	1.94	1.00	2.90	2.27	1.33	1.58
4nc600_230_256	NCU07273.1	1.00		1.18	1.35	2.22	3.83	1.48	5.80	5.77	5.11	6.98
4nc600_270_1281	NCU07277.1	3.81		5.98	2.95	2.38	1.97	2.42	1.00	2.02	2.36	2.24
NCU07278.1_41	NCU07278.1							1.00	4.95	5.33	3.69	3.31
4nc605_040_2302	NCU07282.1	2.16		1.51	1.68	1.37	1.46	1.00	1.49	1.22	1.13	1.43
4nc605_080_338	NCU07286.1	1.61		1.33	1.61	1.54	1.50	1.47	1.00	1.84	1.94	2.02
4nc605_100_287	NCU07287.1	2.98		1.12	1.10	1.24	1.00	1.05	2.05	2.65	2.39	2.54
4nc605_120_539	NCU07289.1	1.00		1.23	1.29	1.32	1.52	1.72	1.55	1.55	1.68	1.54
4nc605_150_308	NCU07294.1	1.67		1.37	1.38	1.36	1.60	1.00	1.89	1.35	1.47	1.32
4nc605_160_775	NCU07295.1	1.21		1.17	1.30	1.38	1.46	1.00	1.63	1.46	1.43	1.43
4nc605_230_847	NCU07302.1	1.08		1.05	1.04	1.21	1.22	1.00	1.47	1.22	1.14	1.30
4nc605_240_64	NCU07304.1	1.16		1.03	1.11	1.25	1.21	1.00	1.34	1.48	1.28	1.40
4nc610_030_6003	NCU07307.1	3.08		1.87	2.53	2.47	2.11	2.29	1.06	1.63	1.00	1.05
4nc610_040_5458	NCU07308.1	2.94		1.98	2.53	2.20	1.92	2.67	1.00	1.26	1.45	1.49
4nc610_050_250	NCU07309.1	1.12		1.23	1.32	1.67	1.81	1.00	1.96	1.62	1.41	1.43
4nc610_060_405	NCU07310.1	1.00		1.20	1.21	1.32	1.24	1.26	1.46	1.59	1.37	1.53
4nc610_100_2258	NCU07313.1	1.00		1.13	1.36	1.42	1.53	1.41	1.71	1.38	1.39	1.77
4nc610_140_505	NCU07318.1	1.00		1.89	1.40	1.50	1.72	1.36	2.59	1.85	1.91	2.33
4nc610_150_2285	NCU07319.1	1.63		1.13	1.49	2.05	2.08	1.30	1.89	1.06	1.00	1.36
4nc610_160_1088	NCU07320.1	1.00		1.04	1.03	1.01	1.21	1.09	1.54	1.01	1.02	1.00
4nc610_200_544	NCU07324.1							1.00	20.02	3.12	1.74	3.09
4nc610_210_11	NCU07325.1	1.00		1.44	1.47	2.64	2.92	1.85	27.97	28.76	25.35	17.22
4nc610_260_245	NCU07328.1	1.65		1.86	1.82	1.87	1.38	1.40	1.00	1.35	1.18	1.07
4nc610_300_1447	NCU07332.1	1.22		1.00	1.12	1.77	1.96	1.53	2.23	1.87	1.80	1.81
4nc610_320_1468	NCU07334.1	1.18		2.85	1.77	1.66	1.27	1.11	1.01	1.16	1.08	1.00
4nc610_390_563	NCU07341.1	1.06		1.24	1.45	1.56	1.29	1.25	1.48	1.18	1.11	1.00
4nc610_400_1124	NCU07342.1	1.33		1.27	1.40	1.41	1.50	1.00	1.60	1.23	1.27	1.19
xnc070_020_510	NCU07345.1							1.00	17.88	39.04	35.16	32.21
xnc070_080_878	NCU07352.1	15.90		35.58	25.46	19.31	15.90	32.08	1.00	17.96	32.67	25.23
xnc072_090_888	NCU07363.1	1.35		1.00	1.10	1.93	3.12	2.03	2.38	1.08	1.75	2.76
xnc072_110_269	NCU07365.1	1.32		1.12	1.10	1.30	1.30	1.00	1.32	1.44	1.29	1.59
xnc072_120_1858	NCU07366.1	2.57		1.00	1.37	1.92	2.51	1.89	5.02	1.97	1.94	2.05
xnc073_060_76	NCU07371.1	1.36		1.35	1.33	1.50	1.40	1.00	2.22	1.86	1.57	1.72
xnc073_080_2187	NCU07374.1	1.33		1.23	1.27	1.36	1.51	1.00	1.76	1.45	1.55	1.26
xnc073_090_1851	NCU07375.1	1.54		1.41	1.34	1.55	1.77	1.00	2.24	1.83	1.76	1.63
xnc073_120_1380	NCU07380.1	1.82		1.15	1.38	1.00						
xnc073_150_2050	NCU07383.1	1.36		1.43	1.34	1.19	1.20	1.00	1.14	1.18	1.06	1.21
xnc073_180_733	NCU07386.1	1.78		1.44	1.59	1.00						
xnc074_010_2007	NCU07389.1	2.05		1.55	1.44	1.74	1.58	1.00	1.44	1.24	1.17	1.17
b24a11_010_1350	NCU07392.1	1.53		1.21	1.28	1.47	1.80	1.00	2.77	1.96	1.83	1.83

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b24a11_020_2402	NCU07393.1	1.50		1.39	1.46	1.43	1.56	1.00	1.42	1.33	1.30	1.27
b24a11_120_286	NCU07403.1	1.48		1.68	1.74	1.57	1.41	1.49	1.16	1.00	1.15	1.20
b24a11_140_567	NCU07405.1	1.98		1.73	1.59	1.45	1.29	1.00	1.11	1.33	1.43	1.33
b24a11_250_1296	NCU07416.1	1.16		1.27	1.00	1.02						
b24a11_290_330	NCU07420.1	5.84		3.87	4.24	3.23	2.50	2.63	1.00	2.28	2.14	2.28
b24a11_310_633	NCU07422.1	1.00		1.33	1.43	1.64	1.85	1.10	1.32	1.68	1.34	1.55
b24a11_330_0	NCU07424.1	1.27		1.21	1.11	1.45	1.85	1.00	2.64	1.97	1.94	1.73
1nc120_090_101	NCU07434.1	1.56		1.46	1.63	1.69	1.76	1.00	1.63	1.69	1.69	1.52
1nc120_120_255	NCU07437.1	1.60		1.46	2.04	1.82	1.74	1.19	1.00	1.10	1.19	1.81
1nc120_130_1659	NCU07438.1	1.25		1.40	1.35	1.37	1.57	1.00	1.19	1.46	1.70	1.90
1nc120_140_103	NCU07439.1	1.00		1.27	1.12	2.57	3.87	2.48	4.59	3.15	3.09	5.17
1nc120_190_1901	NCU07445.1	1.37		1.24	1.35	1.41	1.56	1.00	1.52	1.49	1.47	1.28
1nc120_230_252	NCU07449.1	1.00		1.02	1.00	1.02	1.89	1.35	4.06	3.45	3.59	3.42
1nc120_240_839	NCU07450.1	1.00		1.08	1.08	1.20	1.28	1.34	1.52	1.36	1.35	1.46
1nc120_260_1169	NCU07452.1	1.00		1.24	1.28	1.19	1.27	1.22	1.18	1.25	1.30	1.65
1nc120_290_764	NCU07455.1	1.01		1.01	1.00	1.54	1.90	1.04	1.78	1.74	1.10	1.45
1nc130_030_1363	NCU07458.1	1.07		1.00	1.46	1.63	1.90	1.12	2.36	1.77	1.70	2.01
1nc130_130_394	NCU07468.1	1.86		1.00	1.54	1.69						
1nc140_060_481	NCU07485.1	1.14		1.17	1.30	1.48	1.56	1.00	1.62	1.19	1.30	1.30
1nc140_090_1526	NCU07489.1	1.32		1.41	1.29	1.61	1.43	1.00	1.98	1.27	1.41	1.63
1nc140_130_697	NCU07493.1	1.61		1.71	1.78	1.54	1.99	1.58	1.00	1.38	1.36	1.99
1nc140_140_152	NCU07494.1	1.12		1.40	1.62	1.71	2.17	1.00	1.76	1.60	1.56	1.59
1nc140_150_828	NCU07495.1							1.00	3.83	4.90	2.65	2.99
1nc140_160_6110	NCU07496.1	1.40		1.56	1.27	1.54	1.63	1.00	1.05	1.17	1.27	1.25
1nc140_190_583	NCU07499.1	1.08		1.25	1.33	1.24	1.46	1.00	1.75	1.18	1.15	1.26
1nc140_230_60	NCU07503.1	2.31		2.69	1.70	1.00						
1nc140_240_1838	NCU07504.1	1.00		2.02	2.02	2.66						
1nc140_250_1031	NCU07505.1	3.25		3.23	2.40	3.05	3.18	1.42	1.00	1.64	1.81	2.59
1nc140_260_808	NCU07506.1	1.00		1.19	1.09	1.31	1.47	1.80	1.21	2.10	1.68	1.43
xnc079_010_189	NCU07510.1	1.17		1.24	1.34	1.40	1.54	1.00	1.51	1.36	1.32	1.18
xnc080_030_1491	NCU07517.1	1.02		1.04	1.00	1.02	1.09	1.15	1.27	1.15	1.12	1.14
xnc081_010_2087	NCU07523.1	1.04		1.14	1.37	1.43	1.20	1.00	8.62	2.42	1.20	1.72
xnc081_080_174	NCU07529.1	1.00		1.01	1.05	1.11	1.17	1.14	1.03	1.23	1.25	1.24
xnc081_090_1488	NCU07530.1	1.20		1.27	1.24	1.15	1.09	1.26	1.15	1.12	1.18	1.00
xnc081_100_2191	NCU07531.1	1.63		1.39	1.51	1.49	1.54	1.00	1.70	1.41	1.39	1.38
xnc081_110_136	NCU07532.1	1.34		1.37	1.45	1.52	1.63	1.00	1.77	1.51	1.54	1.26
xnc081_160_2291	NCU07535.1	1.19		1.27	1.36	1.57	1.85	1.00	1.52	1.60	1.46	1.49
xnc081_170_1156	NCU07536.1	2.27		2.43	2.80	2.74	2.31	2.52	1.00	2.70	2.24	2.54
xnc081_180_1467	NCU07537.1	1.17		1.18	1.27	1.58	1.84	1.00	1.95	1.50	1.42	1.39
xnc081_190_672	NCU07538.1	1.32		1.09	1.22	1.51	1.64	1.00	1.75	1.50	1.45	1.27
xnc081_220_1290	NCU07541.1	2.13		1.86	1.25	1.00						
xnc081_240_1805	NCU07543.1	1.17		1.16	1.24	1.50	1.79	1.00	1.32	1.42	1.51	1.64
xnc081_280_89	NCU07547.1	1.37		1.45	1.22	1.75	2.86	1.00	5.16	3.46	3.18	2.90
xnc081_300_166	NCU07549.1	1.53		1.50	1.48	1.37	1.23	1.00	1.11	1.40	1.52	1.27
xnc081_310_25	NCU07550.1	6.36		4.71	6.23	7.32	5.90	6.75	1.00	3.76	3.92	2.66
xnc085_030_2869	NCU07557.1	1.12		1.22	1.25	1.08	1.10	1.25	1.15	1.18	1.19	1.00
xnc085_070_1960	NCU07561.1	2.29		2.88	2.47	2.52	2.82	2.73	1.00	1.32	1.92	3.79
xnc085_080_14	NCU07562.1	6.47		4.40	4.79	3.84	2.54	2.69	1.00	2.44	2.66	2.92
xnc085_090_883	NCU07563.1	1.02		1.09	1.06	1.04	1.06	1.18	1.13	1.05	1.08	1.00
xnc085_130_1529	NCU07567.1	1.94		1.75	1.85	1.84	1.93	1.49	1.33	1.12	1.00	1.51
xnc086_050_1231	NCU07574.1	2.02		1.42	1.63	1.74	1.74	1.34	1.00	1.39	1.50	1.65
3nc250_010_0	NCU07581.1	1.08		1.14	1.20	1.63	1.95	1.00	2.13	1.76	1.13	1.48
3nc250_030_595	NCU07583.1	1.14		1.15	1.41	1.75	1.73	1.00	2.23	1.48	1.48	1.61
3nc250_050_383	NCU07585.1	1.33		2.35	2.42	2.38	2.30	1.00	2.21	3.18	2.72	2.57
3nc250_090_491	NCU07589.1							1.33	1.00	1.14	1.21	1.15
3nc250_300_1585	NCU07605.1	1.39		1.63	1.61	1.66	1.91	2.00	1.00	1.40	1.73	1.65
3nc250_310_957	NCU07605.1	1.08		1.15	1.28	1.40	1.56	1.00	2.13	1.74	1.36	1.44
3nc270_020_686	NCU07608.1	1.01		1.11	1.14	1.02	1.10	1.21	1.00	1.17	1.19	1.00
3nc270_040_357	NCU07610.1	1.02		1.11	1.11	1.21	1.06	1.00	1.21	1.35	1.49	1.45
3nc270_110_1634	NCU07617.1	1.37		1.25	1.34	1.63	2.17	1.00	3.56	2.00	1.93	1.75
3nc270_120_5003	NCU07618.1	1.00		1.17	1.14	1.37	1.82	1.04	2.22	1.07	1.13	1.25
3nc272_020_1401	NCU07623.1	1.00		1.34	1.25	1.15	1.27	1.18	1.13	1.36	1.51	1.62
b2h10_060_849	NCU07640.1	1.15		1.15	1.18	1.31	1.50	1.00	1.68	1.39	1.36	1.17
b2h10_050_1058	NCU07641.1	4.75		7.21	3.60	2.27	1.87	2.96	1.00	2.32	2.92	2.63
NCU07649.1_1047	NCU07649.1	1.00		1.31	1.08	1.13						
3nc280_030_604	NCU07654.1	1.32		1.03	1.10	1.35	1.66	1.00	1.57	1.46	1.44	1.48
3nc280_050_466	NCU07656.1	1.22		1.05	1.00	1.02						
3nc280_080_1220	NCU07659.1	2.64		1.44	1.59	1.00						
4nc400_020_285	NCU07661.1	1.11		1.02	1.27	1.52	1.83	1.00	2.42	1.59	1.44	1.49
4nc400_070_448	NCU07666.1	1.36		1.10	1.14	1.23	1.15	1.00	1.62	1.54	1.30	1.66
NCU07696.1_66	NCU07696.1							1.00	3.60	3.42	1.72	1.56
4nc410_050_643	NCU07697.1	1.79		1.75	1.66	1.24	1.03	1.21	1.00	1.28	1.12	1.15
4nc410_080_2092	NCU07700.1	3.77		2.45	2.59	1.95	1.63	2.53	1.00	1.79	2.00	2.23
4nc410_130_2625	NCU07706.1	1.01		3.63	2.09	2.72	3.02	4.31	1.00	2.70	3.06	3.69

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc412_030_343	NCU07718.1	1.00		1.25	1.29	1.34	1.86	1.14	1.52	1.34	1.58	1.54
4nc412_090_59	NCU07723.1	1.02		1.13	1.51	2.21	2.11	1.81	1.00	1.49	1.79	1.84
4nc412_100_1735	NCU07724.1	1.77		1.53	1.57	1.87	1.90	1.77	1.00	1.69	1.82	2.14
4nc412_170_1150	NCU07731.1							1.00	2.15	2.39	1.09	1.25
4nc412_180_831	NCU07732.1	3.74		2.86	3.49	2.53	2.16	2.29	1.00	1.30	1.31	1.96
4nc412_210_695	NCU07735.1	1.57		1.26	1.39	1.15	1.09	1.06	1.00	1.17	1.15	1.54
g15g1_020_1131	NCU07737.1	1.62		1.56	1.49	1.35	1.49	1.96	1.00	1.22	1.45	1.33
g15g1_050_1203	NCU07740.1	1.00		1.26	1.34	1.65	1.68	1.41	2.71	3.62	1.58	1.74
g15g1_060_1182	NCU07741.1	1.16		1.03	1.00	1.02	1.08	1.24	1.16	1.04	1.09	1.13
g15g1_070_1261	NCU07742.1	1.24		1.19	1.24	1.08	1.07	1.02	1.23	1.13	1.00	1.49
g15g1_110_168	NCU07746.1	1.00		1.32	1.23	1.52	2.10	1.06	2.42	1.41	1.13	1.25
g15g1_190_1356	NCU07754.1	1.00		1.19	1.39	1.73	2.08	1.04	1.51	1.35	1.26	1.32
g15g1_270_623	NCU07761.1	1.04		1.21	1.28	1.09	1.08	1.30	1.01	1.18	1.21	1.00
104h10_045_150	NCU07770.1	1.00		1.15	1.08	1.06	1.13	1.03	1.12	1.07	1.05	1.22
104h10_070_332	NCU07773.1	1.06		1.12	1.23	1.46	1.68	1.00	1.59	1.45	1.34	1.33
104h10_100_30	NCU07776.1	1.27		1.01	1.13	1.37	1.35	1.00	1.53	1.66	1.72	2.55
104h10_140_125	NCU07782.1	1.22		1.20	1.23	1.55	1.97	1.00	2.48	2.08	1.92	1.73
104h10_160_1337	NCU07784.1	1.05		1.00	1.07	1.49						
104h10_180_308	NCU07786.1	1.00		2.95	2.35	3.10	2.80	1.06	2.82	2.28	2.25	3.77
104h10_190_206	NCU07787.1	1.00		6.55	3.64	2.51	2.09	4.34	2.04	9.44	9.95	4.56
104h10_240_343	NCU07790.1	1.21		1.79	1.92	2.08	2.15	1.27	1.00	1.14	1.15	1.42
b9d12_020_646	NCU07795.1	1.30		1.22	1.15	1.15	1.18	1.19	1.00	1.11	1.27	1.34
NCU07800.1_113	NCU07800.1	1.33		1.34	1.22	1.39	1.75	1.00	2.92	2.07	1.84	2.02
b9d12_090_581	NCU07802.1	1.15		1.33	1.12	1.25	1.56	1.00	1.12	1.56	1.25	1.37
b9d12_100_256	NCU07804.1	1.03		1.51	1.48	1.72	1.68	1.21	1.00	1.55	1.51	1.68
b9d12_120_233	NCU07806.1							1.00	5.92	3.45	2.25	1.94
NCU07807.1_625	NCU07807.1	5.04		6.88	7.20	6.11	4.77	6.36	1.00	2.75	2.90	2.64
NCU07813.1_369	NCU07813.1	1.18		1.20	1.29	1.29	1.43	1.00	1.67	1.49	1.44	1.34
NCU07814.1_1224	NCU07814.1	1.20		1.00	1.03	1.04						
3nc185_030_443	NCU07817.1	1.00		3.33	1.37	1.12	1.23	1.02	1.42	2.65	2.83	1.82
3nc185_050_917	NCU07819.1	4.69		4.80	4.77	15.35	12.98	3.39	1.00	10.37	22.12	25.63
3nc185_070_1143	NCU07821.1	1.00		2.16	1.36	1.39	1.60	1.64	1.22	1.31	1.43	1.51
3nc185_120_1	NCU07826.1	5.66		4.73	5.05	4.20	2.79	2.95	1.00	2.89	2.75	3.06
3nc185_150_408	NCU07829.1	7.07		6.11	5.77	3.97	2.40	2.65	1.00	2.75	3.26	3.23
3nc185_160_163	NCU07830.1	6.80		5.35	5.78	4.33	2.91	3.22	1.00	2.74	3.10	3.09
3nc185_170_2163	NCU07831.1	1.68		1.07	1.29	1.40	1.16	1.00	1.22	1.17	1.07	1.17
3nc185_190_7	NCU07833.1	1.05		1.17	1.25	1.66	2.04	1.00	2.55	2.10	1.86	2.27
3nc190_010_327	NCU07842.1	2.20		1.50	1.55	2.15	2.05	1.00	2.76	2.25	1.43	1.76
3nc190_110_626	NCU07853.1	2.94		7.46	8.36	6.84	5.07	5.97	1.00	6.07	7.63	5.12
3nc190_150_36	NCU07857.1	5.43		4.31	4.44	2.96	2.05	2.05	1.00	2.29	2.68	2.62
3nc190_170_644	NCU07859.1	1.40		1.21	1.61	1.61	1.46	1.01	1.21	1.10	1.00	1.11
3nc190_180_1386	NCU07860.1	1.19		1.07	1.10	1.00	1.14	1.16	1.73	1.80	1.69	1.51
3nc190_210_5589	NCU07863.1	1.63		1.51	1.55	1.59	1.82	1.00	2.07	1.76	1.61	1.76
3nc190_230_2504	NCU07865.1	1.91		1.81	2.20	2.37	2.77	2.47	1.11	1.12	1.00	3.17
3nc190_240_3889	NCU07866.1	1.13		1.00	1.06	1.16	1.90	1.00	1.87	1.15	1.10	1.07
3nc190_260_4477	NCU07868.1	1.91		1.00	1.03	1.20	1.32	1.33	1.45	1.52	1.09	1.34
3nc190_270_1463	NCU07869.1	1.00		1.02	1.07	1.03	1.13	1.33	1.26	1.29	1.32	1.30
3nc190_280_2892	NCU07870.1	1.04		1.15	1.30	1.50	1.83	1.03	2.19	2.38	1.00	1.16
3nc195_070_811	NCU07881.1	1.57		1.38	1.16	1.14	1.12	1.16	1.00	1.00	1.10	1.23
3nc195_100_629	NCU07884.1	1.00		1.15	1.19	1.19	1.19	1.13	1.31	1.33	1.23	1.26
3nc195_120_41	NCU07886.1	1.00		1.04	1.18	1.31						
4nc275_010_659	NCU07891.1	1.00		1.23	1.09	1.12						
4nc280_040_1760	NCU07901.1	1.00		1.13	1.22	1.42	1.58	1.90	1.58	1.70	1.76	1.64
4nc280_060_241	NCU07903.1	1.37		1.31	1.37	1.63	1.80	1.00	2.77	1.99	1.89	1.84
4nc280_080_68	NCU07904.1	1.21		1.14	1.30	1.33	1.43	1.00	1.14	1.39	1.40	1.19
4nc280_120_364	NCU07908.1	1.00		1.15	1.17	1.67	2.25	1.06	3.25	2.52	2.09	2.09
4nc280_140_780	NCU07910.1	1.22		1.67	1.23	1.35	1.28	1.00	1.24	1.15	1.14	1.10
4nc280_170_44	NCU07913.1	1.00		1.03	1.09	1.53	1.45	1.16	1.39	1.43	1.41	1.66
4nc280_180_710	NCU07914.1	12.43		16.99	16.33	10.43	9.14	12.99	1.00	7.69	10.15	5.85
4nc280_190_32	NCU07915.1							1.00	2.25	3.07	1.79	2.09
4nc280_210_38	NCU07917.1	1.00		1.08	1.03	1.42	1.76	1.07	1.97	1.97	1.76	1.63
4nc280_220_2039	NCU07918.1	1.38		3.76	3.51	2.92	2.76	1.00	3.87	3.00	2.26	3.10
4nc280_250_248	NCU07921.1	1.06		1.02	1.11	1.00	1.09	1.08	1.69	1.84	1.75	1.90
4nc280_260_2536	NCU07922.1	4.10		2.59	2.46	1.82	1.56	1.64	1.00	1.26	1.45	2.04
4nc280_270_1713	NCU07923.1	1.10		1.20	1.35	1.55	1.85	1.00	3.69	2.52	1.25	1.37
4nc280_280_3375	NCU07924.1	1.02		1.19	1.29	1.32	1.58	1.00	1.65	1.42	1.35	1.34
4nc280_300_1178	NCU07926.1	1.19		1.08	1.13	1.20	1.32	1.00	1.80	1.21	1.27	1.28
4nc280_330_64	NCU07929.1	2.31		1.56	1.85	1.74	1.68	1.00	1.72	1.41	1.68	1.79
4nc280_340_1053	NCU07930.1	4.28		2.43	2.65	3.23	2.62	2.50	1.00	1.62	1.29	1.16
4nc280_370_117	NCU07933.1	1.19		1.07	1.05	1.56	1.87	1.00	2.23	1.93	1.67	1.83
4nc280_450_1309	NCU07941.1	1.25		1.00	1.24	2.29	2.60	2.41	1.71	1.62	1.70	2.00
4nc285_020_437	NCU07947.1	1.79		1.07	1.58	2.05	1.69	1.20	1.00	1.17	1.47	1.65

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc285_040_160	NCU07948.1	1.10		1.13	1.21	2.10	3.89	1.00	8.25	3.38	2.07	2.48
4nc285_060_267	NCU07951.1	1.23		1.30	1.28	1.50	1.63	1.00	1.53	1.36	1.31	1.18
4nc285_090_508	NCU07954.1	1.27		1.17	1.30	1.24	1.35	1.00	1.16	1.26	1.21	1.09
4nc285_140_1090	NCU07959.1	6.05		8.16	8.70	8.03	5.91	7.77	1.00	2.52	2.53	2.57
4nc285_160_43	NCU07962.1	1.59		2.38	1.65	1.79	2.01	1.00	1.54	1.59	1.40	1.23
4nc285_190_486	NCU07965.1	1.00		1.18	1.53	2.39	2.29	2.43	1.12	1.83	1.96	2.17
4nc285_250_55	NCU07972.1	1.56		1.68	1.45	1.86	1.84	1.74	1.00	1.38	1.25	1.77
4nc550_010_1346	NCU07974.1	1.22		1.14	1.06	1.00						
4nc550_020_2408	NCU07975.1	1.11		1.09	1.55	1.64	2.06	1.00	2.73	1.87	1.67	1.72
4nc550_080_357	NCU07982.1	1.08		1.24	1.31	1.68	1.42	1.00	1.40	1.21	1.24	1.13
4nc550_150_1	NCU07989.1	1.13		1.00	1.40	2.02						
4nc550_180_2242	NCU07992.1	1.05		1.00	1.12	1.21	1.41	1.47	1.40	1.32	1.40	1.40
4nc550_200_836	NCU07994.1	1.00		1.45	1.31	1.66	2.06	1.98	2.15	2.30	1.84	2.38
4nc550_230_926	NCU07997.1	1.00		2.47	2.78	3.19	2.96	3.03	1.18	1.23	1.74	3.22
b2n18_300_656	NCU07998.1	1.50		1.28	1.25	1.44	1.55	1.00	2.12	1.51	1.54	1.56
b2n18_280_2902	NCU08000.1	1.39		1.20	1.19	1.11	1.11	1.00	1.07	1.20	1.23	1.09
b2n18_260_1249	NCU08002.1	1.06		1.00	1.46	2.55	3.22	2.63	2.04	1.80	2.46	2.40
b2n18_220_1700	NCU08006.1	1.29		1.10	1.11	1.14	1.00	1.03	1.24	1.24	1.03	1.15
b2n18_120_3247	NCU08020.1	1.00		1.11	1.16	1.11	1.26	1.37	1.05	1.07	1.40	1.39
b2n18_110_3180	NCU08021.1	1.37		1.09	1.26	1.54	2.04	1.00	2.14	1.69	1.50	1.56
b2e7_020_2343	NCU08033.1	1.22		1.20	1.24	1.52	1.78	1.00	2.22	1.93	1.67	1.88
b2e7_030_468	NCU08034.1	1.00		1.07	1.28	1.59						
b2e7_050_1702	NCU08036.1	1.18		1.02	1.16	1.39	1.49	1.00	1.62	1.48	1.32	1.34
b2e7_120_429	NCU08044.1	1.99		2.21	2.64	3.41	3.14	3.48	1.00	3.13	3.62	2.88
b2e7_140_387	NCU08046.1	3.74		3.14	3.67	2.73	2.10	2.24	1.00	2.06	2.12	2.13
b2e7_150_2273	NCU08047.1	1.26		1.27	1.40	1.65	1.52	1.00	1.54	1.36	1.34	1.14
1nc100_060_141	NCU08053.1	1.59		1.75	1.73	2.14	2.23	1.00	1.75	1.44	1.15	2.59
idi4_412	NCU08055.1	1.56		1.66	1.34	1.44	1.56	1.00	1.63	1.43	1.47	1.35
1nc100_100_612	NCU08057.1	1.00		1.10	1.18	1.30	1.60	1.35	2.84	2.56	1.93	1.64
1nc100_110_1525	NCU08058.1	1.00		1.08	1.21	1.17	1.19	1.16	1.22	1.16	1.11	1.21
1nc100_160_3785	NCU08064.1							1.00	1.91	1.72	1.30	1.83
1nc100_200_463	NCU08067.1	1.04		1.04	1.18	1.46	1.87	1.00	1.20	1.15	1.14	1.33
1nc100_220_510	NCU08069.1	1.31		1.64	1.52	1.97	1.62	1.00	1.89	1.73	1.59	1.80
1nc100_300_593	NCU08077.1	1.27		1.57	1.46	1.93	1.67	1.40	1.00	1.44	1.43	2.03
1nc100_310_69	NCU08078.1							1.00	1.83	1.85	1.38	1.59
1nc100_400_241	NCU08087.1	1.05		1.03	1.10	2.31	3.47	1.00	6.70	4.16	4.38	5.02
1nc100_420_162	NCU08090.1	1.35		1.39	1.40	1.33	1.46	1.00	1.32	1.20	1.20	1.09
1nc100_440_618	NCU08091.1	1.54		1.34	1.50	1.67	4.67	1.00	3.52	1.82	1.73	1.66
1nc100_460_122	NCU08093.1	1.72		1.41	1.42	1.88	1.55	1.57	1.00	1.41	1.45	1.57
1nc100_470_190	NCU08094.1	1.14		1.31	1.28	1.41	1.57	1.00	1.72	1.34	1.28	1.26
1nc100_530_267	NCU08100.1	1.00		1.09	1.15	1.30	1.51	1.45	1.70	1.93	1.40	1.65
1nc104_050_2080	NCU08110.1	1.08		1.09	1.12	1.12	1.02	1.00	1.27	1.14	1.16	1.19
1nc104_070_1089	NCU08112.1	1.00		1.05	1.10	1.36						
1nc106_070_1188	NCU08120.1	2.84		2.35	2.46	1.29	1.05	1.00	1.32	1.61	1.37	1.82
7nc650_060_867	NCU08128.1	1.00		1.06	1.02	1.26	2.12	1.03	2.81	1.98	1.48	1.39
7nc650_080_301	NCU08130.1	1.43		1.00	1.21	2.93	4.18	2.70	4.70	3.08	3.15	4.48
7nc650_090_1020	NCU08131.1	1.20		1.00	1.14	1.37	1.84	1.68	2.66	1.57	1.94	2.21
7nc650_100_7003	NCU08132.1	1.45		1.06	1.25	1.39	1.33	1.00	2.99	1.41	1.13	1.75
7nc650_110_333	NCU08133.1	1.15		1.14	1.00	1.22	1.29	1.21	1.02	1.53	1.55	1.33
7nc651_010_63	NCU08137.1	1.60		2.19	1.99	2.05	1.97	1.50	1.00	1.28	1.40	1.25
7nc652_040_481	NCU08146.1	1.25		1.17	1.17	1.36	1.44	1.00	1.55	1.23	1.28	1.13
7nc652_120_1365	NCU08152.1	1.23		1.24	1.33	1.65	1.59	1.00	2.01	1.41	1.33	1.56
7nc652_130_1315	NCU08153.1	1.61		2.47	2.10	2.53	1.84	1.00	3.16	2.50	2.08	2.48
7nc652_150_262	NCU08155.1	1.00		1.43	1.40	1.83	2.20	1.15	2.39	2.08	1.92	1.91
7nc653_030_809	NCU08158.1							1.34	1.20	1.00	1.36	1.20
7nc653_060_1326	NCU08162.1	17.58		18.34	20.30	14.93	11.99	22.31	1.00	6.83	7.73	3.83
7nc653_120_1292	NCU08167.1	1.42		1.79	1.68	1.63	1.60	1.75	1.00	1.22	1.41	1.40
7nc653_160_296	NCU08169.1	10.14		15.28	6.98	4.16	3.41	6.52	1.00	4.08	6.06	5.82
7nc653_170_296	NCU08170.1	1.17		1.39	1.39	1.84	2.45	1.00	3.50	2.23	2.00	2.02
7nc653_180_1044	NCU08171.1	3.85		2.15	2.07	1.67	1.43	1.58	1.00	1.47	1.44	1.43
7nc654_080_1443	NCU08180.1	1.00		1.13	1.05	1.12	1.23	1.52	1.17	1.15	1.29	1.20
7nc654_120_46	NCU08182.1	1.38		1.22	1.12	1.51	1.82	1.00	2.58	2.09	2.00	1.88
7nc654_130_120	NCU08183.1	1.09		2.22	1.87	1.00						
7nc654_140_116	NCU08184.1	1.00		1.72	1.89	1.81						
7nc654_190_1191	NCU08188.1	3.13		4.66	2.08	1.56	1.46	2.00	1.00	1.51	2.22	2.22
xnc090_010_849	NCU08189.1	1.24		1.37	1.24	1.36	2.13	3.44	1.00	2.64	2.98	3.32
xnc090_050_69	NCU08193.1	1.00		1.17	1.66	2.08	1.46	2.17	1.98	2.94	2.90	1.48
xnc090_060_762	NCU08194.1	1.00		1.24	1.18	1.14	1.16	1.26	1.10	1.17	1.13	1.12
xnc090_270_1483	NCU08216.1	7.03		4.33	3.31	3.47	3.92	2.79	1.00	1.69	2.75	3.87
xnc090_370_1871	NCU08226.1	1.72		2.44	1.89	1.84	1.44	1.54	1.25	1.09	1.00	1.43
xnc090_390_1403	NCU08228.1	1.55		4.39	1.92	1.00						
xnc090_400_674	NCU08229.1	1.22		1.43	1.33	1.00						

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
xnc090_420_1420	NCU08230.1	1.00		1.18	1.31	1.93	2.37	1.31	3.28	3.47	2.54	2.69
xnc090_440_548	NCU08232.1	1.13		1.11	1.55	1.41	1.54	1.53	1.00	1.35	1.39	1.34
xnc090_480_1204	NCU08236.1	1.81		1.47	2.43	3.58	4.53	5.67	1.00	1.78	2.22	3.72
xnc090_700_458	NCU08257.1	1.23		1.18	1.20	1.40	1.69	1.00	2.81	2.10	1.90	1.70
xnc090_710_189	NCU08258.1	1.18		1.22	1.17	1.24	1.74	1.00	1.47	1.18	1.21	1.07
xnc090_740_947	NCU08261.1	1.05		1.35	1.50	1.50	1.86	1.00	1.89	1.73	1.99	1.81
4nc346_030_168	NCU08269.1	3.36		11.73	8.86	6.72	6.35	8.88	1.00	6.65	6.28	5.53
4nc346_060_1414	NCU08272.1	1.00		2.00	2.31	3.29	2.52	4.46	1.71	4.96	4.74	2.86
4nc346_070_2197	NCU08273.1	1.29		1.04	1.00	1.19	1.34	1.02	1.52	1.67	1.51	1.68
4nc346_090_1434	NCU08275.1	1.22		1.29	1.27	1.16	1.11	1.18	1.05	1.34	1.24	1.00
4nc348_010_1332	NCU08280.1	1.42		2.23	1.72	1.36	1.23	1.52	1.00	1.49	1.58	1.13
4nc348_030_142	NCU08282.1	1.00		2.34	3.11	4.72	4.46	3.48	2.42	1.63	1.67	3.44
4nc348_040_3708	NCU08283.1	1.00		1.83	1.48	1.78	2.82	3.06	2.22	1.97	2.81	3.32
4nc348_080_5310	NCU08287.1	3.55		2.13	1.74	1.27	1.00	1.44	1.06	1.83	1.71	1.64
4nc350_020_1410	NCU08290.1	2.62		2.44	2.06	1.72	1.78	1.00	1.75	1.41	1.30	1.12
4nc350_030_850	NCU08291.1	1.00		2.08	2.00	1.91						
4nc350_070_704	NCU08295.1	2.78		1.94	1.07	1.00						
4nc350_140_201	NCU08302.1	1.53		1.16	1.00	1.08						
4nc350_160_1631	NCU08307.1							1.00	5.12	1.92	1.23	1.68
4nc350_170_717	NCU08308.1	1.00		1.33	1.40	1.66	2.34	1.19	3.25	2.56	1.97	2.04
4nc350_250_3697	NCU08316.1	1.45		1.16	1.41	1.26	1.30	1.00	1.13	1.25	1.23	1.10
4nc350_370_409	NCU08329.1	1.83		2.05	2.04	2.35	2.28	1.18	1.00	1.44	1.56	2.41
4nc350_380_448	NCU08330.1	2.10		7.31	6.09	5.96	5.12	7.00	1.00	3.29	3.89	2.48
NCU08332.1_365	NCU08332.1	6.33		3.70	3.26	6.11	6.34	1.00	5.23	2.22	1.87	2.59
1nc540_010_2933	NCU08334.1	1.00		1.45	1.97	2.69	2.47	2.44	1.85	1.81	2.23	2.40
1nc540_030_1690	NCU08336.1	3.47		3.29	3.40	2.91	2.59	3.66	1.00	3.72	3.03	2.56
1nc540_070_241	NCU08340.1	1.26		1.07	1.42	1.79	1.73	1.00	1.41	1.38	1.39	1.33
1nc540_100_642	NCU08343.1	1.00		1.14	1.18	1.33	1.27	1.34	1.15	1.17	1.38	1.49
1nc540_110_64	NCU08344.1	6.53		5.15	5.30	3.69	2.43	2.60	1.00	2.87	3.30	3.28
1nc540_180_81	NCU08351.1	1.00		1.04	1.02	1.19	1.46	1.33	1.57	2.01	2.27	3.06
1nc540_210_47	NCU08353.1	1.18		1.32	1.25	1.60	1.81	1.00	2.50	1.97	1.82	1.66
1nc540_240_1562	NCU08356.1	1.26		1.36	1.32	1.95	2.09	2.19	1.00	1.91	2.33	3.90
1nc540_310_570	NCU08363.1	1.03		1.00	1.16	1.77						
1nc540_320_1687	NCU08364.1	1.12		1.00	1.69	1.82	1.71	1.31	2.17	2.35	4.13	5.38
1nc540_350_311	NCU08367.1	1.00		1.34	1.26	1.36	1.53	1.06	1.72	1.48	1.41	1.33
1nc540_420_295	NCU08374.1	1.10		1.09	1.17	1.53	1.71	1.00	1.89	1.66	1.23	1.73
1nc540_430_1546	NCU08375.1	1.68		1.50	1.40	1.56	1.45	1.49	1.00	1.34	1.35	1.59
1nc540_450_6808	NCU08377.1	1.01		1.02	1.00	1.48						
1nc542_020_2401	NCU08382.1	1.00		1.28	1.32	2.06	2.28	1.80	2.75	1.48	1.68	2.20
1nc542_040_625	NCU08384.1	1.00		1.21	1.34	1.30	2.55	2.80	1.20	2.39	2.45	2.55
1nc542_050_821	NCU08385.1	1.40		1.26	1.39	1.37	1.36	1.92	1.00	1.84	2.43	3.21
1nc542_090_4	NCU08389.1	2.82		2.45	2.61	2.52	1.89	1.50	1.00	1.82	1.80	1.79
1nc542_100_379	NCU08390.1	1.94		2.93	2.73	2.43	2.05	2.18	1.00	1.53	1.62	1.45
2nc825_050_2395	NCU08397.1	1.02		1.23	1.30	1.19	1.16	1.44	1.00	1.09	1.15	1.03
2nc820_010_391	NCU08402.1	1.00		1.31	1.32	1.55						
2nc820_020_424	NCU08403.1	1.00		1.24	1.33	2.26	3.71	1.26	4.48	2.72	2.39	3.51
2nc820_060_927	NCU08406.1	1.00		1.15	1.10	1.16	1.30	1.20	1.03	1.34	1.42	1.62
2nc820_080_742	NCU08407.1	1.00		1.10	1.11	1.05	1.06	1.21	1.10	1.13	1.09	1.06
2nc820_100_2013	NCU08409.1	3.69		6.52	5.27	4.46	4.64	8.16	1.00	4.50	4.74	4.52
2nc820_120_217	NCU08410.1	1.41		1.30	1.32	1.38	1.42	1.00	1.61	1.62	1.66	1.71
2nc820_130_90	NCU08411.1	5.12		4.92	6.01	4.14	3.73	3.70	1.00	2.56	3.19	2.05
2nc820_180_244	NCU08415.1	1.00		1.07	1.05	1.34	1.46	1.30	1.22	1.14	1.35	1.55
2nc820_200_4275	NCU08417.1	1.72		1.28	1.00	1.44	1.84	1.35	1.73	1.65	1.89	3.04
2nc819_010_1263	NCU08418.1	1.00		1.69	2.35	3.85	6.58	1.28	11.29	4.01	2.41	2.49
b13b3_210_339	NCU08425.1							1.41	1.00	1.34	1.39	1.48
b13b3_180_528	NCU08427.1	1.21		1.24	1.35	1.44	1.63	1.00	1.80	1.57	1.53	1.30
b13b3_120_209	NCU08433.1	1.00		1.25	1.48	1.66	1.85	1.14	1.79	1.76	1.46	1.25
b13b3_110_105	NCU08434.1	4.20		3.51	4.59	3.84	4.13	4.30	1.00	2.68	3.76	3.52
b13b3_090_1025	NCU08436.1	1.01		1.16	1.32	1.42	1.52	1.00	1.43	1.31	1.24	1.09
b13b3_070_206	NCU08438.1	1.02		1.00	1.03	1.09	1.10	1.16	1.39	1.30	1.24	1.38
b13b3_050_479	NCU08440.1	1.00		1.07	1.17	1.24						
2nc700_020_148	NCU08448.1	1.27		1.32	1.25	1.39	1.49	1.00	1.47	1.29	1.33	1.32
2nc700_030_2897	NCU08449.1							1.13	1.05	1.07	1.11	1.00
2nc700_060_132	NCU08454.1	1.31		1.37	1.40	1.45	1.66	1.00	1.99	1.67	1.58	1.43
2nc700_070_387	NCU08455.1							1.00	7.41	5.99	4.93	5.84
2nc700_090_253	NCU08457.1	1.00		2.56	8.91	44.70						
NCU08460.1_38	NCU08460.1	1.04		1.39	1.74	1.84	2.07	1.57	2.94	3.30	1.00	1.11
b9j10_100_3039	NCU08468.1	1.31		1.66	1.38	1.41	1.32	1.66	1.00	1.25	1.56	1.53
b9j10_140_1248	NCU08471.1	1.67		1.20	1.39	1.00						
b9j10_230_681	NCU08476.1	1.02		1.32	1.25	1.00	1.45	1.43	1.16	1.55	1.61	1.64
NCU08497.1_299	NCU08497.1	1.41		1.36	1.48	1.69	1.97	1.00	1.83	1.47	1.20	1.60

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
b11b22_030_2227	NCU08499.1	1.08		1.00	1.18	1.00	1.27	1.19	1.70	1.25	1.20	1.32
b11b22_020_181	NCU08500.1	6.08		4.84	5.51	3.57	2.39	2.42	1.00	2.61	2.67	2.62
b18p7_010_445	NCU08502.1	9.01		6.64	7.16	4.65	3.06	3.46	1.00	3.20	3.69	3.73
b18p7_090_1213	NCU08510.1	1.25		1.24	1.34	1.66	1.47	1.00	1.40	1.38	1.29	1.09
b18p7_140_676	NCU08514.1	1.19		1.17	1.08	1.00						
b18p7_150_1299	NCU08515.1	1.49		1.00	1.27	1.96	1.70	1.59	1.45	1.54	1.47	1.62
b18p7_160_1051	NCU08516.1	1.02		1.00	1.01	1.28	1.98	1.21	1.90	1.54	1.55	1.65
b18p7_170_2061	NCU08517.1	1.09		1.23	1.13	1.10	1.17	1.27	1.12	1.06	1.09	1.00
3nc700_030_102	NCU08523.1	1.35		1.40	1.40	1.63	1.78	1.00	1.36	1.30	1.32	1.28
3nc700_050_1487	NCU08525.1	1.24		1.30	1.25	1.42	1.51	1.00	1.65	1.38	1.34	1.17
3nc700_160_6741	NCU08535.1	2.08		1.64	2.14	1.78	1.71	1.93	1.00	1.36	1.42	1.56
NCU08536.1_76	NCU08536.1	1.00		1.30	1.46	1.57	1.92	1.27	2.51	2.28	1.42	1.57
3nc700_200_323	NCU08541.1	1.24		1.07	1.03	2.55	2.66	5.01	1.00	3.69	4.83	6.73
3nc700_260_1049	NCU08547.1	1.16		1.55	1.38	1.70	2.87	1.00	2.54	2.31	2.34	2.37
3nc700_300_382	NCU08550.1	2.28		1.67	1.89	1.67	1.70	1.16	1.00	1.32	1.23	1.50
3nc700_320_70	NCU08552.1	3.73		3.18	3.29	3.38	2.64	2.08	1.00	2.30	2.67	4.01
3nc700_340_478	NCU08554.1	1.00		1.09	1.32	2.12	2.50	3.07	1.44	2.25	3.46	4.26
b13m15_040_2423	NCU08558.1	1.00		7.78	5.63	5.84						
b13m15_080_861	NCU08561.1	1.05		1.00	1.28	1.77	1.84	1.88	1.76	2.10	2.07	1.46
b13m15_110_3735	NCU08565.1	1.27		1.20	1.32	1.44	1.61	1.00	1.37	1.27	1.25	1.17
b13m15_120_1072	NCU08566.1	1.00		1.17	1.10	1.27	1.76	1.04	2.39	1.77	1.49	1.40
NCU08568.1_200	NCU08568.1	1.57		1.39	1.43	1.30	1.25	1.00	1.04	1.22	1.24	1.04
1nc792_010_966	NCU08594.1	1.26		1.26	1.12	1.48	1.75	1.00	1.92	1.41	1.46	1.61
1nc792_020_127	NCU08595.1	1.44		1.53	1.13	1.23	1.94	1.00	1.86	1.73	1.60	1.66
1nc796_030_2997	NCU08600.1	1.03		1.06	1.17	1.54	1.85	1.00	3.06	1.94	1.92	1.78
1nc796_080_227	NCU08605.1	1.53		1.42	1.54	1.57	1.58	1.00	1.49	1.41	1.40	1.15
1nc800_010_1131	NCU08607.1	1.46		1.00	1.23	2.40						
1nc800_130_312	NCU08620.1	3.50		2.54	2.87	2.10	1.45	1.62	1.00	1.67	1.83	1.65
1nc800_140_373	NCU08621.1	1.74		1.51	1.33	1.75	2.06	1.00	1.62	1.59	1.93	2.21
1nc800_210_181	NCU08627.1	4.56		3.79	4.09	3.20	2.02	2.31	1.00	2.52	2.62	2.71
1nc800_220_2803	NCU08628.1	1.00		1.16	1.22	1.36	1.57	1.01	1.57	1.38	1.36	1.19
NCU08635.1_66	NCU08635.1							1.00	3.05	2.62	1.79	2.27
4nc673_040_2489	NCU08651.1	1.38		1.73	1.95	2.30	2.73	1.00	1.48	1.56	2.17	2.31
4nc673_080_730	NCU08656.1	1.00		1.20	1.44	1.54	1.43	1.54	1.33	1.17	1.26	1.22
4nc673_090_91	NCU08657.1	1.15		1.19	1.33	1.45	1.49	1.00	1.47	1.13	1.07	1.36
4nc673_160_1195	NCU08663.1	2.15		1.59	1.66	1.42	1.36	1.00	1.13	1.33	1.31	1.20
4nc675_020_1849	NCU08667.1	1.20		1.22	1.31	1.44	1.73	1.00	1.44	1.43	1.49	1.24
4nc675_040_1278	NCU08669.1	1.26		1.00	1.33	1.67	1.50	2.13	1.16	1.71	1.91	1.97
4nc675_050_1086	NCU08670.1	1.06		1.00	1.06	1.28	1.22	1.00	2.44	1.83	1.47	1.70
4nc675_110_63	NCU08677.1	1.20		1.00	1.36	3.37	3.93	2.60	4.88	4.84	4.34	7.04
4nc677_030_650	NCU08688.1							1.00	2.72	1.90	1.57	1.82
4nc679_010_805	NCU08693.1	1.85		1.53	1.94	1.63	1.57	1.00	1.20	1.19	1.16	1.32
b24m22_250_760	NCU08699.1	1.14		1.23	1.12	1.09	1.00	1.00	2.18	2.10	2.24	2.14
b24m22_240_2554	NCU08700.1	1.00		1.04	1.26	1.51	1.83	1.05	1.38	1.32	1.37	1.48
b24m22_190_1002	NCU08706.1	1.11		1.07	1.06	1.37	1.69	1.00	1.95	1.70	1.71	1.39
b24m22_160_1751	NCU08709.1	1.00		1.31	1.11	1.78	2.67	1.45	2.59	1.41	2.36	4.02
b24m22_110_1303	NCU08715.1	1.00		1.02	1.11	1.17	1.43	1.28	1.93	1.63	1.66	1.93
b24m22_010_2221	NCU08726.1							1.00	8.52	3.03	2.47	2.79
b11o9_090_287	NCU08727.1							1.00	3.67	1.76	1.99	4.35
b11o9_070_6	NCU08728.1	1.52		2.35	1.50	1.52	1.21	1.00	1.62	2.09	2.14	2.79
b11o9_010_1300	NCU08733.1	1.04		1.00	1.06	1.14						
b24n4_060_1565	NCU08738.1	1.00		1.20	1.74	1.73	2.31	1.81	2.08	2.87	2.42	3.96
b24n4_110_95	NCU08743.1	1.32		1.12	1.35	1.58	1.53	1.00	1.46	1.45	1.09	1.13
b24n4_140_1091	NCU08746.1							6.79	1.00	3.92	7.71	7.62
2nc550_010_182	NCU08751.1	4.00		8.17	5.82	7.30	5.02	8.06	1.00	4.35	4.14	3.98
2nc550_050_2481	NCU08755.1	1.14		1.09	1.00	1.45	2.50	1.81	2.76	1.91	2.10	2.38
2nc550_090_667	NCU08760.1	1.23		1.30	1.55	1.73	1.53	1.46	1.00	1.20	1.24	1.91
b2g14_070_1609	NCU08766.1	1.00		1.55	1.42	1.46	1.75	2.08	1.63	2.06	1.86	2.32
b2g14_110_14	NCU08769.1							1.00	15.34	12.02	10.50	9.22
b2g14_120_39	NCU08770.1	1.05		1.34	1.00	11.90	18.05	2.25	29.98	28.29	21.22	14.40
b2g14_140_1012	NCU08772.1	1.34		1.16	1.14	1.18	1.00	1.26	1.43	1.77	1.69	1.62
2nc560_070_804	NCU08784.1	1.00		1.12	1.15	1.09	1.11	1.30	1.08	1.15	1.17	1.07
2nc560_110_1220	NCU08788.1	1.00		1.01	1.09	1.57	1.89	1.09	2.18	2.08	1.94	2.09
2nc560_120_200	NCU08789.1	1.27		1.33	1.31	1.59	1.62	1.00	1.64	1.34	1.25	1.44
2nc560_130_465	NCU08790.1	1.20		1.37	1.23	1.55	1.58	1.00	2.02	1.41	1.30	1.39
2nc560_140_1097	NCU08791.1	1.00		1.18	1.61	2.39	2.59	2.59	6.40	5.26	4.82	5.76
2nc560_190_1451	NCU08796.1	1.01		1.00	1.08	1.22	1.18	1.08	1.56	1.67	1.87	1.97
4nc700_120_317	NCU08810.1	1.00		1.02	1.20	1.58	1.74	1.18	1.63	1.90	1.92	1.80
4nc705_030_1	NCU08814.1	1.00		1.16	1.18	1.60	1.53	1.13	1.53	1.35	1.16	1.29
4nc705_050_19	NCU08818.1	1.06		1.00	1.15	1.32						
NCU08824.1_792	NCU08824.1	1.00		1.46	1.61	1.92	2.14	1.04	1.08	1.26	1.63	1.44
4nc710_020_901	NCU08825.1	1.00		1.18	1.29	1.28	1.31	1.25	1.12	1.21	1.13	1.41

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc710_030_1968	NCU08826.1	1.26		1.33	1.47	1.32	1.35	1.42	1.05	1.00	1.26	1.18
4nc710_050_2579	NCU08828.1	1.01		1.04	1.00	1.26	1.43	1.52	1.35	1.40	1.36	1.46
NCU08844.1_1955	NCU08844.1	1.05		1.07	1.00	1.30	1.61	1.28	1.54	1.54	1.38	1.30
NCU08847.1_500	NCU08847.1	1.00		2.50	3.31	3.16	5.90	4.52	3.28	3.36	3.12	5.81
5e6_270_1617	NCU08850.1							1.00	3.01	2.43	3.06	4.27
5e6_210_775	NCU08855.1	1.00		1.38	1.38	1.48	1.69	1.62	1.77	1.55	1.62	1.51
5e6_200_548	NCU08856.1	1.17		1.05	1.04	1.10	1.00	1.09	1.11	1.28	1.51	1.56
5e6_170_192	NCU08859.1	1.00		1.34	1.25	1.17	1.33	1.01	1.12	1.18	1.06	1.37
5e6_150_221	NCU08861.1	1.52		1.51	1.53	1.00						
5e6_130_1035	NCU08863.1							1.83	1.00	1.34	1.86	2.40
NCU08871.1_82	NCU08871.1	1.00		1.04	1.10	1.16	1.39	1.39	2.28	2.33	1.16	1.39
b4b2_070_59	NCU08877.1	1.49		1.47	1.55	1.68	1.66	1.53	1.00	1.59	1.42	1.11
b4b2_060_191	NCU08878.1	1.53		1.33	1.31	1.59	1.78	1.00	2.43	1.67	1.72	1.53
b14a21_220_194	NCU08888.1	1.63		1.38	1.52	1.49	1.56	1.00	1.27	1.27	1.26	1.11
b14a21_160_1767	NCU08894.1	3.67		2.73	3.50	2.99	2.41	3.74	1.00	2.15	2.37	2.77
b14a21_120_1316	NCU08897.1	1.37		1.00	1.30	1.72	1.66	1.08	1.95	1.38	1.00	1.18
b14a21_040_74	NCU08903.1	1.81		1.39	1.22	1.00						
b14a21_030_948	NCU08904.1	1.23		1.11	1.14	1.34	2.48	1.00	3.24	1.85	1.71	1.54
b24g20_140_272	NCU08907.1	1.00		1.61	1.23	1.19	1.10	1.54	1.72	3.94	3.42	3.07
b24g20_120_1300	NCU08909.1	1.81		1.23	1.14	1.10	1.00	1.11	1.18	1.03	1.14	1.36
b24g20_070_474	NCU08916.1	1.13		1.09	1.14	1.38	1.90	1.00	2.08	1.59	1.57	1.33
b24g20_060_89	NCU08917.1	1.26		1.09	1.04	1.17	6.55	1.07	1.03	1.14	1.00	1.21
b24g20_030_1765	NCU08920.1	2.36		1.44	1.19	1.16	1.17	1.07	1.01	1.00	1.05	1.49
b24g20_020_2985	NCU08921.1	1.00		1.06	1.10	1.23	1.36	1.03	2.34	1.80	1.60	1.55
b24g20_010_176	NCU08922.1	1.07		1.00	1.22	2.24	3.63	2.28	5.25	3.24	2.40	3.05
NCU08923.1_16	NCU08923.1	5.95		4.32	4.70	2.68	1.57	1.63	1.00	1.77	2.15	2.12
20h10_010_1471	NCU08924.1	1.00		1.20	1.37	1.85	2.16	2.47	1.61	2.04	2.04	2.29
20h10_080_535	NCU08930.1	1.52		1.26	1.43	1.84	1.65	1.32	1.52	1.35	1.00	1.24
20h10_090_359	NCU08931.1	1.00		1.09	1.53	2.08	1.88	1.25	2.96	2.35	1.55	1.51
20h10_120_714	NCU08935.1	1.00		1.10	1.35	1.59	1.75	1.20	1.83	1.65	1.46	1.56
20h10_130_1017	NCU08936.1	1.94		1.48	1.35	1.39	1.38	1.76	1.00	1.24	1.46	1.37
20h10_170_41	NCU08940.1	2.17		2.07	2.11	2.10	1.62	1.42	1.00	1.56	1.44	1.17
20h10_230_692	NCU08946.1	1.51		1.55	1.73	1.77	1.57	1.60	1.00	1.41	1.58	1.55
20h10_260_383	NCU08949.1	1.26		1.00	1.02	2.02	2.07	1.31	6.91	5.51	4.06	4.01
NCU08950.1_8	NCU08950.1	1.09		1.28	1.00	1.55	2.10	1.02	2.60	2.68	1.98	2.38
20h10_300_277	NCU08954.1	1.54		1.00	1.70	3.12	2.59	3.27	1.08	1.70	1.56	1.95
NCU08957.1_3930	NCU08957.1	2.81		2.49	2.93	2.83	4.65	5.16	1.00	2.65	4.91	6.96
NCU08960.1_78	NCU08960.1	5.54		4.51	4.81	3.78	2.44	2.76	1.00	2.66	2.89	2.90
5nc500_010_2852	NCU08961.1	1.00		1.20	1.32	1.31	1.56	1.24	1.07	1.00	1.46	1.16
5nc500_020_1931	NCU08962.1	1.10		1.10	1.07	1.02	1.05	1.21	1.01	1.04	1.08	1.00
5nc500_030_154	NCU08963.1	5.91		4.51	4.99	4.20	2.54	2.52	1.00	2.64	2.64	3.05
5nc500_040_296	NCU08964.1	3.73		2.87	3.11	2.47	1.85	1.97	1.00	1.96	2.22	2.40
xnc100_010_168	NCU08973.1	1.55		1.39	1.70	1.77	1.38	1.36	1.05	1.08	1.00	1.55
xnc100_060_770	NCU08976.1	1.57		1.00	1.43	1.87	1.97	1.60	1.32	1.38	1.05	1.16
xnc100_070_2086	NCU08977.1	1.01		1.00	1.52	2.50	2.47	3.04	1.20	1.88	2.01	3.19
xnc100_100_1602	NCU08980.1	3.08		3.87	3.35	2.87	1.12	1.00	1.15	1.70	1.82	2.27
xnc100_200_41	NCU08990.1	4.56		3.96	4.42	3.39	2.17	2.11	1.00	2.44	2.61	2.58
xnc100_300_1299	NCU08998.1	1.54		1.59	1.72	1.63	1.59	1.70	1.00	1.42	1.46	1.47
xnc100_330_1261	NCU09001.1	1.00		1.25	1.17	1.11						
xnc100_340_212	NCU09002.1	1.35		1.27	1.26	1.57	1.38	1.15	1.00	1.15	1.13	1.07
xnc100_360_156	NCU09004.1	2.29		1.94	1.67	1.55	1.52	1.38	1.00	1.35	1.32	1.57
xnc103_010_633	NCU09020.1	1.03		1.53	1.16	1.51	1.72	1.00	2.10	1.45	1.48	1.38
xnc103_030_1107	NCU09023.1	1.28		1.50	1.49	1.49	1.60	1.00	1.55	1.42	1.39	1.19
xnc103_040_1256	NCU09024.1	1.00		1.13	1.30	1.19	1.38	1.56	1.23	1.50	1.51	1.56
xnc103_060_1139	NCU09026.1	1.18		1.34	1.39	1.52	1.64	1.00	2.15	1.93	1.89	1.37
xnc103_120_2173	NCU09032.1	1.04		1.09	1.20	1.34	1.54	1.00	1.35	1.15	1.04	1.07
xnc103_130_1540	NCU09033.1	1.00		1.02	1.09	1.14	2.10	1.01	1.98	1.82	1.50	1.55
xnc103_150_472	NCU09035.1	1.17		1.36	1.36	1.24	1.31	1.51	1.00	1.16	1.21	1.20
xnc103_170_1899	NCU09037.1							1.00	1.28	1.08	1.08	1.13
xnc103_200_690	NCU09040.1	1.00		4.68	4.56	9.39	7.47	2.25	25.34	44.76	36.39	35.43
xnc103_210_729	NCU09041.1	1.17		1.37	1.00	2.34	2.15	1.10	2.16	2.29	1.98	2.23
xnc103_220_2962	NCU09042.1	1.13		1.21	1.19	1.06	1.18	1.27	1.08	1.13	1.16	1.00
xnc103_230_750	NCU09043.1	1.25		1.00	1.10	2.90	4.15	2.20	4.99	3.72	3.35	3.11
xnc103_250_347	NCU09046.1	1.23		1.35	1.29	1.59	2.12	1.00	2.84	1.98	1.83	1.88
xnc104_020_268	NCU09049.1	1.00		1.03	1.08	1.44	1.42	1.04	2.54	3.98	3.39	3.47
xnc104_050_804	NCU09051.1							1.00	4.25	4.83	2.92	4.74
xnc104_070_769	NCU09053.1	1.57		1.90	1.64	1.55	1.55	1.40	1.00	1.14	1.44	1.35
xnc104_100_2049	NCU09056.1	1.24		1.00	1.04	1.04	1.36	1.28	1.78	1.63	1.31	1.33
xnc104_110_56	NCU09057.1	1.36		1.19	1.13	1.48	1.61	1.00	2.64	1.96	1.73	1.61
1nc200_080_931	NCU09076.1	1.12		1.00	1.16	1.48						
1nc200_110_2364	NCU09079.1	2.24		1.10	1.14	1.26	1.15	1.00	2.08	1.79	1.43	1.51
1nc200_140_512	NCU09081.1	1.00		1.21	1.08	1.10	1.37	1.10	2.23	1.76	1.66	1.50
1nc200_180_1537	NCU09085.1	1.12		1.46	1.33	1.32	1.25	1.16	1.19	1.04	1.05	1.00

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
NCU09086.1_14	NCU09086.1	1.23		1.26	1.33	2.00	2.17	1.00	4.03	2.35	2.41	2.22
1nc200_210_13	NCU09089.1	3.88		3.18	3.78	3.28	2.26	2.21	1.00	2.55	2.63	2.83
1nc200_250_1514	NCU09093.1	1.03		1.00	1.15	1.26	1.30	1.12	1.32	1.31	1.32	1.63
1nc200_290_2696	NCU09097.1	1.00		1.31	1.30	1.16	1.19	1.47	1.10	1.24	1.26	1.10
1nc200_330_1009	NCU09101.1	1.00		1.10	1.16	1.31	1.31	1.12	1.96	1.84	1.66	2.04
NCU09105.1_494	NCU09105.1	1.40		1.47	1.67	2.03	2.59	1.00	2.96	2.35	2.24	1.89
xnc105_030_1128	NCU09108.1	1.15		1.87	1.05	1.03	1.09	1.00	1.56	1.77	1.20	1.46
xnc105_040_22	NCU09109.1	5.16		4.05	4.44	3.28	2.01	2.10	1.00	2.53	2.90	2.87
xnc105_050_1402	NCU09111.1	1.71		1.12	1.43	1.27	1.00	1.28	1.20	1.36	1.63	1.73
xnc105_070_1566	NCU09113.1	1.23		1.48	1.38	1.33	1.19	1.47	1.00	1.21	1.29	1.27
xnc105_100_1285	NCU09115.1	1.00		1.04	1.18	1.32	1.57	1.48	1.70	1.32	1.66	1.80
xnc105_110_813	NCU09116.1	1.13		1.51	1.41	1.14	1.17	1.07	1.13	1.16	1.00	1.03
xnc105_120_496	NCU09117.1	1.59		1.08	1.04	1.00						
xnc107_010_531	NCU09119.1	1.95		1.82	1.78	1.68	1.42	1.39	1.00	1.38	1.46	1.45
xnc107_120_1880	NCU09130.1	1.28		1.29	1.15	1.33	1.46	1.00	1.98	2.02	1.80	1.68
xnc107_130_1497	NCU09131.1	2.60		1.97	1.25	1.00						
xnc107_150_191	NCU09133.1	5.27		5.38	5.43	4.36	4.30	6.95	1.00	2.80	4.76	4.77
xnc107_160_106	NCU09134.1	1.05		1.35	1.30	1.78	2.18	1.00	2.49	2.02	1.46	1.74
xnc107_180_969	NCU09136.1	1.00		1.26	1.25	1.23	1.40	1.03	2.47	1.85	1.77	1.89
xnc107_200_828	NCU09138.1	1.23		1.03	1.19	1.76	1.71	2.19	1.00	1.64	1.75	1.80
xnc107_230_673	NCU09141.1	1.00		1.24	1.53	2.30						
xnc107_250_187	NCU09143.1	2.13		2.14	2.08	2.20	1.94	1.62	1.00	1.45	1.60	1.58
xnc109_040_355	NCU09148.1							1.00	4.58	5.45	3.96	7.11
xnc109_070_1013	NCU09153.1	1.00		1.21	1.31	1.77	2.07	1.11	1.17	1.31	1.40	1.54
xnc110_080_344	NCU09163.1	1.18		1.26	1.29	1.57	1.75	1.00	2.08	1.59	1.58	1.41
xnc110_110_238	NCU09166.1	1.09		1.00	1.00	1.39	1.74	1.01	2.33	1.66	1.37	1.56
xnc110_140_796	NCU09169.1	1.00		1.44	1.17	2.19	2.18	2.38	1.55	2.54	3.50	5.66
xnc110_150_1094	NCU09170.1							1.83	1.00	2.64	2.88	3.98
xnc110_180_732	NCU09173.1	1.18		1.18	1.15	1.43	1.57	1.00	1.82	1.58	1.46	1.31
xnc110_200_843	NCU09175.1	4.86		3.77	3.14	2.91	2.75	3.34	1.00	2.54	3.05	3.45
xnc110_280_0	NCU09182.1	3.61		2.80	2.73	3.12	2.05	1.88	1.00	1.53	2.17	1.97
xnc110_300_631	NCU09184.1	1.00		1.10	1.14	1.52	1.75	1.04	2.07	2.15	1.87	1.64
xnc110_360_582	NCU09190.1	1.26		1.53	1.37	1.23	1.55	1.57	1.00	1.29	1.56	1.25
b1d14_010_2981	NCU09191.1	1.22		1.23	1.24	1.29	1.69	1.37	1.00	1.01	1.08	1.28
b1d14_030_726	NCU09193.1	1.00		1.09	1.25	1.34	1.42	1.11	1.91	1.42	1.34	1.19
b1d14_090_483	NCU09199.1	1.00		1.26	1.34	1.75	1.80	1.24	2.36	1.88	1.63	1.67
b1d14_120_1281	NCU09202.1	1.50		1.00	1.16	1.31	1.23	1.18	1.08	1.03	1.15	1.44
b1d14_190_1357	NCU09208.1	1.23		1.14	1.11	1.44	1.75	1.00	2.82	2.00	1.98	1.94
b1d14_200_1988	NCU09209.1	1.23		1.34	1.46	1.74	1.61	1.00	1.23	1.43	1.44	1.45
b1d14_210_1482	NCU09210.1	1.00		1.36	1.62	5.76	5.13	1.10	2.74	2.12	1.92	2.68
b1d14_220_3429	NCU09211.1	1.14		1.14	1.16	1.51	1.75	1.00	1.98	1.59	1.47	1.50
b1d14_230_1768	NCU09212.1							1.00	1.61	1.74	1.33	1.51
b1d14_240_200	NCU09213.1	1.00		1.01	1.35	1.45	1.18	1.28	1.50	2.60	2.05	2.45
b1d14_280_902	NCU09217.1	1.85		1.45	1.46	1.34	1.53	1.00	1.09	1.52	1.57	1.32
NCU09222.1_9	NCU09222.1	1.37		1.40	1.51	1.70	1.34	1.13	1.00	1.18	1.23	1.48
NCU09223.1_1366	NCU09223.1	1.22		1.00	1.24	2.28	2.93	1.09	4.43	1.82	1.41	1.87
NCU09227.1_1968	NCU09227.1	1.34		1.36	1.37	1.22	1.29	1.46	1.00	1.14	1.33	1.17
NCU09228.1_2571	NCU09228.1	1.64		1.35	1.50	1.46	1.37	1.79	1.00	1.33	1.43	1.46
b8j22_020_1024	NCU09230.1	1.26		1.04	1.07	1.24	1.19	1.00	2.05	2.45	1.19	1.47
b8j22_030_634	NCU09231.1	1.49		1.62	1.44	1.29	1.24	1.35	1.00	1.08	1.22	1.26
b8j22_060_305	NCU09235.1	1.00		2.52	3.66	6.89	7.10	10.01	31.28	42.87	43.85	58.77
b8j22_150_2542	NCU09241.1							1.16	1.14	1.15	1.18	1.00
b8j22_180_3477	NCU09244.1	1.23		1.16	1.16	1.32	1.62	1.00	2.04	1.65	1.57	1.44
b8j22_230_397	NCU09248.1	1.00		1.10	1.21	1.45	2.28	1.05	1.95	1.42	1.07	1.77
b8j22_240_124	NCU09249.1	1.08		1.00	1.21	1.43	1.58	1.03	1.31	1.39	1.23	1.11
b8j22_250_4	NCU09250.1	2.49		3.49	3.74	3.91	3.94	3.66	2.16	1.00	2.53	3.11
b8j22_260_79	NCU09251.1	1.16		1.14	1.60	1.91	1.62	1.27	1.00	1.61	1.20	1.36
b23l4_020_1667	NCU09253.1	1.57		1.05	1.10	1.00	1.58	1.15	2.08	1.35	1.12	1.29
b23l4_090_508	NCU09260.1	1.49		1.23	1.41	1.31	1.13	1.00	1.04	1.04	1.13	1.16
b23l4_120_124	NCU09263.1	2.37		1.02	1.00	2.20	4.56	1.70	9.11	3.48	2.20	3.70
b23l4_150_1083	NCU09265.1	1.84		1.36	1.55	1.76	1.83	1.08	1.71	1.00	1.37	1.53
b23l4_160_1072	NCU09266.1	1.00		1.23	1.55	2.86	4.09	3.13	2.35	3.07	3.25	4.15
xnc112_010_2424	NCU09270.1	1.09		1.24	1.33	1.40	1.90	1.00	2.55	1.99	1.58	1.48
xnc112_030_2971	NCU09272.1	1.29		1.22	1.19	1.09	1.50	1.21	1.36	1.00	1.11	1.11
xnc112_050_1601	NCU09274.1	1.20		1.09	1.00	1.04	1.86	1.01	1.50	1.25	1.18	1.14
xnc112_060_142	NCU09275.1	1.00		1.08	1.18	1.50	1.78	1.05	2.15	1.93	1.55	1.21
xnc114_010_840	NCU09285.1	1.22		1.00	1.30	1.97	2.17	2.63	2.30	3.40	3.40	3.96
xnc114_030_402	NCU09286.1	1.00		1.19	1.64	1.72						
xnc114_020_405	NCU09286.1	1.08		1.20	1.34	1.50	2.14	1.00	2.12	1.75	1.35	1.40
xnc114_040_1226	NCU09287.1	1.00		1.02	1.34	1.89	2.13	2.42	2.47	2.47	2.47	3.15
xnc114_050_767	NCU09288.1	1.28		1.11	1.16	1.30	1.42	1.00	1.79	1.26	1.24	1.16
xnc114_070_433	NCU09290.1	1.00		1.12	1.28	1.59	1.64	1.28	1.42	1.65	1.46	1.52
xnc115_020_768	NCU09295.1	1.50		1.20	1.05	1.00						

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
xnc115_030_2025	NCU09296.1	1.20		1.30	1.28	1.35	1.48	1.00	1.40	1.21	1.17	1.15
xnc115_050_1142	NCU09298.1	1.13		1.13	1.28	1.53	1.74	1.00	1.84	1.52	1.46	1.30
xnc115_070_84	NCU09299.1	1.35		1.26	1.52	1.88	1.78	1.30	1.23	1.33	1.00	1.09
xnc115_120_578	NCU09304.1	1.19		1.38	1.16	1.14	1.31	1.29	1.14	1.31	1.15	1.00
1nc448_030_663	NCU09309.1	1.00		1.09	1.44	1.57	1.58	1.31	1.27	1.08	1.10	1.48
1nc448_060_158	NCU09312.1	1.00		1.45	1.92	2.66	3.04	1.37	2.24	1.85	1.90	2.07
1nc448_080_357	NCU09314.1	1.01		1.19	1.17	1.12	1.09	1.20	1.07	1.08	1.16	1.00
1nc450_110_1454	NCU09326.1	6.97		5.62	4.95	2.93	2.69	3.29	1.00	1.84	2.03	1.44
1nc450_130_1881	NCU09328.1	1.40		1.39	1.39	1.61	2.21	1.00	1.73	1.57	1.41	1.47
1nc450_160_43	NCU09331.1	1.16		1.00	1.07	1.35						
1nc450_180_1882	NCU09333.1	1.46		1.46	1.37	1.38	1.14	1.01	1.03	1.00	1.15	1.55
71b5_060_464	NCU09342.1	2.21		2.15	2.29	2.12	4.18	1.89	5.51	1.25	1.00	3.42
71b5_070_231	NCU09343.1	1.24		1.28	1.34	1.48	1.74	1.00	1.91	1.52	1.54	1.26
71b5_080_885	NCU09345.1							24.80	1.00	7.33	7.67	3.86
71b5_130_1417	NCU09350.1	1.00		1.29	1.28	2.67	1.96	1.10	3.00	2.25	2.12	2.27
71b5_160_647	NCU09353.1	1.48		1.10	1.06	1.00						
71b5_180_216	NCU09355.1	1.13		1.00	1.16	1.47	1.41	1.03	1.20	1.29	1.55	1.97
1nc440_030_361	NCU09366.1	1.00		1.16	1.28	2.29	2.58	1.23	2.39	1.93	1.58	2.04
1nc440_050_1301	NCU09368.1	1.00		1.25	1.45	1.90	2.09	1.28	1.83	1.22	1.70	2.03
NCU09370.1_2261	NCU09370.1	1.13		1.16	1.23	1.07	1.08	1.17	1.49	1.42	1.00	1.02
1nc446_080_171	NCU09386.1	1.00		1.09	1.28	1.62	1.54	1.26	1.42	1.47	1.55	1.83
1nc446_100_1733	NCU09388.1	1.12		1.09	1.41	1.61	1.28	1.20	1.24	1.00	1.14	1.31
xnc120_040_70	NCU09395.1	1.54		1.48	1.23	1.37	1.53	1.00	2.02	1.78	1.85	2.02
xnc120_050_141	NCU09396.1	1.00		1.23	1.16	1.54	2.33	1.22	2.85	2.26	2.31	2.11
xnc120_060_187	NCU09397.1	1.00		1.08	1.43	1.75	2.10	1.05	2.44	2.07	1.98	2.03
xnc120_140_319	NCU09405.1							1.00	2.81	2.01	1.55	1.41
xnc120_160_2320	NCU09407.1	1.11		1.03	1.00	1.14	1.45	1.41	1.62	1.35	1.42	1.44
b2h3_100_839	NCU09422.1	1.79		1.49	1.38	1.35	1.41	1.25	1.00	1.30	1.28	1.23
b2h3_120_1500	NCU09424.1	1.27		1.44	1.28	1.26	1.32	1.36	1.00	1.24	1.23	1.23
b2h3_170_1102	NCU09429.1	1.00		1.36	1.02	1.84	2.70	1.94	1.86	2.47	2.73	2.49
b2m13_050_2680	NCU09434.1	1.25		1.17	1.18	1.36	1.46	1.00	1.53	1.17	1.10	1.25
b2m13_120_349	NCU09442.1	2.45		2.23	1.92	2.13	2.00	3.11	1.00	1.83	2.46	3.29
b2m13_140_890	NCU09444.1							1.13	1.00	1.20	1.21	1.11
xnc126_020_222	NCU09454.1							1.00	5.04	2.75	2.58	2.46
xnc126_070_299	NCU09460.1	1.43		1.22	1.56	2.06	1.79	1.25	1.45	1.45	1.07	1.00
b10k17_030_3018	NCU09463.1	5.15		3.40	4.41	3.15	3.09	5.32	1.00	2.03	1.99	3.28
b10k17_060_1219	NCU09466.1	1.18		1.00	1.00	1.33	1.76	1.23	2.69	2.37	1.83	1.78
b10k17_080_966	NCU09468.1	1.70		1.58	1.78	1.45	1.36	1.35	1.00	1.29	1.34	1.19
b22k18_200_279	NCU09475.1	2.99		2.16	2.27	1.69	1.20	1.29	1.00	1.49	1.68	1.58
b22k18_190_206	NCU09476.1	5.49		3.81	3.95	3.21	2.11	2.24	1.00	2.57	2.94	3.17
b22k18_180_234	NCU09477.1	4.09		3.87	3.45	2.72	2.13	2.10	1.00	1.79	1.77	1.36
b22k18_150_373	NCU09480.1	1.04		1.11	1.23	1.44	1.50	1.00	1.57	1.50	1.26	1.15
b22k18_120_53	NCU09483.1	1.28		1.17	1.18	1.29	1.35	1.08	1.34	1.00	1.50	1.73
b22k18_110_1370	NCU09484.1	1.09		1.00	1.13	1.51						
b22k18_100_2618	NCU09485.1	1.01		1.00	1.21	1.57	1.93	1.44	3.04	1.86	1.64	1.48
b22k18_080_1074	NCU09487.1	1.11		1.00	1.31	1.57						
b22k18_050_1284	NCU09490.1	1.00		1.24	1.40	1.55	2.28	1.85	1.23	1.25	1.48	1.98
NCU09497.1_752	NCU09497.1	1.73		2.31	1.83	1.78	1.67	1.41	1.55	1.79	1.00	1.03
xnc130_100_1060	NCU09507.1	1.27		1.09	1.00	1.29						
xnc131_020_1400	NCU09511.1	1.17		1.27	1.32	1.48	1.83	1.00	1.83	1.60	1.37	1.43
xnc131_030_120	NCU09512.1	1.03		1.00	1.38	1.73						
xnc131_040_1817	NCU09513.1	1.00		3.65	2.43	2.37	2.71	4.43	1.75	2.19	2.22	2.21
xnc131_080_386	NCU09518.1	1.25		1.25	1.15	1.13	1.51	1.59	1.12	1.02	1.00	1.41
xnc131_110_524	NCU09521.1	2.26		1.96	1.66	2.23	1.29	1.00	1.65	2.41	2.37	2.73
b11e5_450_24	NCU09530.1	1.25		1.30	1.52	1.82	1.94	1.00	2.41	2.07	1.47	1.52
b11e5_420_1005	NCU09533.1	1.33		4.47	2.08	4.58	4.12	5.38	1.00	2.95	3.19	3.45
b11e5_400_1211	NCU09535.1	1.00		1.20	1.23	1.27	1.13	1.63	1.11	1.35	1.39	1.37
b11e5_350_1016	NCU09540.1	1.04		1.18	1.38	1.86	2.38	1.00	2.81	2.35	1.96	2.16
b11e5_330_492	NCU09542.1	1.07		1.00	1.01	1.11	1.21	1.03	1.39	1.29	1.35	1.36
b11e5_250_1953	NCU09549.1	1.23		1.00	1.08	1.27	1.44	1.51	1.46	1.81	1.72	2.05
7nc198_020_505	NCU09560.1	1.23		1.00	1.15	2.24	1.63	1.83	1.23	2.20	2.00	2.26
7nc198_090_849	NCU09567.1	1.05		1.10	1.02	1.54	1.96	1.00	2.08	1.72	1.86	1.71
7nc198_100_869	NCU09568.1	1.00		1.34	2.00	2.57						
7nc200_020_835	NCU09570.1	1.15		1.14	1.25	1.18	1.30	1.00	1.42	1.26	1.20	1.11
7nc200_040_381	NCU09572.1	1.32		1.00	1.28	1.86	1.87	1.15	1.56	1.26	1.22	1.34
7nc200_060_54	NCU09574.1	1.04		1.00	1.14	1.48	2.63	1.21	3.58	2.22	1.62	1.75
7nc200_170_46	NCU09584.1	1.12		1.20	1.39	1.48	1.29	1.03	1.18	1.00	1.00	1.00
b18e6_110_1397	NCU09594.1	1.13		1.09	1.01	1.00						
b3e4_060_2092	NCU09610.1	1.24		1.11	1.33	1.47	1.69	2.03	1.00	1.19	1.48	2.07
b3e4_170_208	NCU09619.1	1.13		1.35	1.47	2.10	2.12	1.00	3.26	2.58	2.00	1.96
4nc137_020_2699	NCU09644.1	1.00		1.09	1.13	1.28						
4nc137_040_188	NCU09646.1	1.00		1.22	1.39	1.98	1.95	1.80	1.39	2.39	2.24	2.48
4nc137_120_1057	NCU09654.1	1.00		1.10	1.13	1.58	1.68	1.28	2.14	1.62	1.57	1.65

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
4nc137_150_1093	NCU09656.1	1.00	1.19	1.21	1.89	1.99	1.72	1.46	1.74	1.78	1.96
64c2_230_354	NCU09674.1	1.87	2.87	2.90	2.49	3.13	3.12	1.00	1.70	1.99	2.02
NCU09675.1_6	NCU09675.1	1.04	1.00	1.08	1.23	1.28	1.24	1.36	1.41	1.08	1.24
64c2_180_840	NCU09680.1	1.24	1.35	1.38	1.56	1.70	1.00	2.10	1.57	1.52	1.41
zz30_64C2_180_20cf	NCU09680.1	1.15	1.13	1.16	1.38	1.70	1.00	1.74	1.55	1.40	1.39
64c2_170_1547	NCU09681.1	1.09	1.16	1.11	1.07	1.10	1.24	1.02	1.14	1.22	1.00
64c2_080_825	NCU09689.1	1.00	1.18	1.27	1.71	2.21	1.03	3.52	2.38	2.33	2.31
64c2_040_0	NCU09693.1	1.01	1.74	1.93	2.71	1.85	1.41	1.00	1.46	1.70	2.32
xnc140_020_2806	NCU09699.1	1.83	1.45	1.50	1.22	1.22	1.12	1.00	1.08	1.05	1.33
xnc140_030_560	NCU09700.1	1.27	1.00	1.12	1.86	2.98	1.36	3.64	2.62	2.91	7.44
xnc140_040_688	NCU09701.1	2.02	1.78	1.78	1.76	1.62	1.00	1.34	1.74	1.71	1.69
xnc140_090_542	NCU09705.1	1.05	1.16	1.19	1.25	1.52	1.00	1.69	1.39	1.37	1.26
xnc140_110_470	NCU09707.1	1.47	1.05	1.17	1.00						
xnc140_190_1039	NCU09715.1	1.56	1.00	1.27	1.73	1.68	1.31	2.12	1.51	1.28	1.62
xnc140_230_1068	NCU09718.1	1.14	1.12	1.09	1.00	1.05	1.23	1.15	1.13	1.17	1.07
4nc300_040_2414	NCU09730.1	1.95	1.92	2.07	2.21	2.30	1.97	1.00	1.14	1.54	2.16
4nc300_050_103	NCU09731.1	1.00	1.66	1.43	1.81						
4nc300_060_1222	NCU09732.1	1.00	1.09	1.05	2.46	3.14	2.71	2.14	2.29	2.18	2.45
4nc300_090_153	NCU09734.1	1.11	1.25	1.00	6.38	31.69	2.61	31.86	9.41	8.79	11.28
4nc300_130_1064	NCU09738.1	1.46	1.61	1.00	1.86	2.47	1.56	1.53	1.43	1.44	1.69
4nc300_160_1531	NCU09741.1	1.00	1.18	1.34	1.49						
4nc300_230_78	NCU09748.1						1.00	1.54	1.43	1.72	2.04
NCU09751.1_2	NCU09751.1	1.00	1.35	1.30	1.53	1.57	1.25	1.52	1.42	1.28	1.29
b24g5_100_384	NCU09754.1	1.00	1.49	1.70	2.00	2.42	1.36	2.30	2.02	2.03	2.07
2nc850_050_470	NCU09768.1	1.42	1.24	1.40	1.56	1.75	1.00	1.85	1.30	1.29	1.24
2nc850_060_1482	NCU09770.1	1.00	1.83	2.05	2.69	2.42	3.78	1.20	3.35	3.45	2.84
2nc850_070_1347	NCU09771.1	1.00	1.19	1.63	2.10	1.44	1.30	6.71	2.85	1.56	1.81
2nc850_100_408	NCU09774.1	11.46	17.44	7.50	4.64	3.76	7.87	1.00	5.54	6.99	6.64
NCU09778.1_881	NCU09778.1	1.08	1.00	1.43	1.65	1.80	1.16	2.88	3.36	2.30	2.61
6nc270_020_636	NCU09789.1	3.72	7.81	7.19	3.93	3.53	4.98	1.00	2.37	2.61	1.65
6nc270_050_1269	NCU09792.1						1.48	1.00	1.47	1.71	2.25
6nc270_070_902	NCU09794.1	1.26	1.38	1.32	1.27	1.36	1.57	1.00	1.55	1.69	1.54
NCU09800.1_406	NCU09800.1	1.00	1.10	1.12	1.28	1.49	1.08	1.36	1.38	1.50	1.64
1nc250_050_83	NCU09806.1	1.08	1.00	1.02	1.60	1.62	1.01	1.60	1.62	1.35	1.94
1nc250_090_1987	NCU09810.1	1.00	1.71	1.41	1.31	1.44	1.72	1.04	1.23	1.53	1.40
1nc250_120_230	NCU09813.1	1.23	1.09	1.00	1.32	1.24	1.26	1.58	1.45	1.36	2.18
1nc255_020_811	NCU09816.1	2.45	2.04	2.05	1.78	1.51	1.63	1.00	1.42	1.32	1.10
1nc255_030_995	NCU09817.1	7.68	5.42	5.73	3.98	3.37	4.01	1.00	2.04	2.41	3.17
1nc255_070_4909	NCU09820.1						1.29	1.07	1.20	1.23	1.00
1nc255_080_692	NCU09821.1	1.01	1.10	1.00	2.36	2.55	1.26	5.71	3.70	3.64	4.40
xnc145_050_248	NCU09827.1	1.26	1.24	1.25	1.26	1.45	1.00	1.65	1.32	1.40	1.19
xnc145_090_1239	NCU09831.1	1.30	1.01	1.00	1.44	1.52	1.34	1.88	1.91	1.50	1.55
xnc148_020_695	NCU09842.1	1.80	1.00	1.25	1.24						
xnc148_030_81	NCU09843.1	1.37	1.24	1.28	1.32	1.60	1.00	1.76	1.42	1.28	1.34
xnc149_110_776	NCU09858.1	1.00	1.18	1.17	1.48	1.31	1.14	1.21	1.21	1.16	1.35
6nc285_010_684	NCU09859.1	1.00	1.06	1.18	1.12	1.20	1.20	2.48	1.97	1.19	1.23
6nc285_020_2130	NCU09860.1	1.33	1.24	1.34	1.42	1.69	1.00	2.24	1.68	1.62	1.38
6nc290_020_1160	NCU09870.1	1.26	2.07	2.03	2.10	2.94	1.00	2.71	2.12	2.42	3.11
6nc290_050_309	NCU09872.1	1.30	1.28	1.35	1.48	1.78	1.68	1.00	1.44	1.37	2.12
6nc290_060_884	NCU09873.1	1.13	1.00	1.38	6.09	11.98	7.24	14.46	8.42	6.95	3.40
xnc150_010_1916	NCU09874.1	5.36	9.53	8.94	8.23	7.47	17.19	1.00	2.92	5.34	3.52
xnc150_030_1309	NCU09876.1	1.07	1.17	1.16	1.25	1.62	1.03	1.20	1.12	1.12	1.00
xnc150_060_1406	NCU09879.1	1.19	1.08	1.07	1.00						
xnc151_040_71	NCU09896.1	2.95	2.80	4.48	4.30	3.70	4.02	1.00	3.25	4.68	2.42
xnc151_050_311	NCU09897.1	1.77	2.27	3.03	3.26	2.81	1.60	1.14	1.00	1.82	2.35
xnc151_080_280	NCU09900.1	1.20	1.27	1.39	1.47	1.48	1.00	1.51	1.40	1.28	1.13
xnc152_040_1133	NCU09904.1	2.74	1.26	1.00	1.53						
xnc153_020_847	NCU09907.1	1.13	1.06	1.19	1.16	1.21	1.00	1.79	1.41	1.46	1.35
xnc153_060_674	NCU09911.1	2.65	2.10	2.35	1.96	1.78	2.20	1.00	1.67	1.87	1.72
xnc153_080_1132	NCU09913.1	1.00	1.04	1.01	1.06	1.28	1.41	1.41	1.34	1.89	1.24
b21j21_130_789	NCU09931.1	1.00	1.54	2.14	6.38	10.54	7.74	12.44	6.46	6.77	8.74
xnc160_030_214	NCU09949.1	1.21	1.24	1.29	1.50	1.60	1.00	1.88	1.63	1.49	1.46
xnc164_050_1544	NCU09974.1	1.00	1.01	1.19	1.43						
xnc164_090_1410	NCU09978.1	1.20	1.34	1.34	1.79	2.13	1.00	3.48	2.33	2.28	2.35
xnc170_050_1475	NCU09990.1	1.16	1.46	1.36	1.98	2.21	1.19	1.52	1.00	1.43	1.58
NCU09995.1_154	NCU09995.1	2.16	1.70	1.50	1.25	1.25	1.00	1.39	1.19	1.28	1.20
NCU09997.1_127	NCU09997.1	1.18	1.03	1.08	1.35	1.49	1.32	1.89	2.02	1.00	1.31
7nc225_030_1528	NCU10007.1	1.00	1.34	1.50	3.72	4.44	4.33	3.95	4.47	4.35	2.17
7nc225_040_1403	NCU10008.1	2.19	2.36	2.29	2.50	2.56	3.97	1.00	2.38	2.50	3.03

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
xnc177_010_4225	NCU10009.1	1.22		1.14	1.00	1.14					
xnc177_030_1403	NCU10011.1						1.77	6.24	2.25	1.00	1.59
xnc178_070_1053	NCU10020.1	1.99		2.14	2.72	3.74	3.30	3.40	1.00	3.76	4.19	8.20
xnc178_080_154	NCU10021.1	1.00		1.68	3.05	3.59	3.63	7.88	1.02	2.80	4.54	5.25
6nc390_040_179	NCU10023.1	1.00		1.22	1.42	1.55	1.71	1.19	1.57	1.52	1.31	1.27
NCU10034.1_308	NCU10034.1	1.01		1.00	1.03	1.33	1.49	1.41	1.51	1.36	1.34	1.52
NCU10035.1_418	NCU10035.1	1.00		1.00	1.14	1.33	1.53	1.04	1.57	1.28	1.20	1.11
NCU10036.1_1888	NCU10036.1	1.18		1.26	1.15	1.43	1.58	1.00	1.45	1.37	1.30	1.13
NCU10040.1_151	NCU10040.1	1.38		1.00	1.31	6.28	5.44	2.60	4.07	3.40	5.21	18.40
NCU10041.1_128	NCU10041.1	1.01		1.09	1.09	1.03	1.05	1.18	1.03	1.00	1.30	1.13
NCU10042.1_911	NCU10042.1	24.82		34.43	29.32	20.51	20.31	30.82	1.00	12.10	14.86	6.10
NCU10046.1_119	NCU10046.1	1.00		1.75	1.46	1.74	2.20	1.26	2.57	2.30	1.74	1.86
NCU10051.1_1016	NCU10051.1	4.08		5.54	3.56	2.67	2.46	3.67	1.00	1.55	1.84	1.79
NCU10055.1_676	NCU10055.1	1.00		1.21	1.48	1.63	2.22	2.02	3.32	4.45	4.66	4.00
NCU10058.1_1515	NCU10058.1	1.23		1.03	1.52	1.89	1.66	2.00	1.00	1.18	1.29	1.57
NCU10061.1_415	NCU10061.1	1.05		1.16	1.22	1.36	1.32	1.00	1.20	1.16	1.18	1.10
NCU10063.1_1181	NCU10063.1	1.21		1.32	1.40	1.70	1.88	1.00	2.15	1.70	1.54	1.36
NCU10066.1_3479	NCU10066.1	1.34		1.00	1.49	1.88	1.84	1.38	1.63	1.45	1.43	1.69
NCU10070.1_1052	NCU10070.1	1.36		1.47	1.46	1.40	1.25	1.36	1.00	1.54	1.75	1.58
NCU10073.1_2339	NCU10073.1	1.00		1.09	1.28	1.47	1.58	1.20	1.78	1.31	1.15	1.29
4nc310_120_108	NULL	1.00		1.45	1.56	1.84						
4nc453_010_959	NULL	1.26		3.40	1.29	1.00						
6nc350_120_118	NULL	1.00		19.18	9.00	7.63						
80a10_350_9	NULL	1.00		1.14	1.35	1.45						
NCU02431.1__1_319	NULL	1.00		1.46	1.69	2.65						
NCU02438.M__NCU02439.1__1_80	NULL	1.00		1.08	1.00	1.84						
NCU09491.M__NCU09492.M__2_657	NULL	1.00		1.34	1.35	1.66						
xnc140_010_71	NULL	1.77		1.62	1.45	1.00						
1nc100_190_173	NULL						1.00	2.92	2.51	2.19	1.84
b12n19_030_18	NULL						1.10	2.83	1.89	1.00	1.16
b13o20_090_115	NULL						1.00	2.19	1.60	1.45	1.24
b2g14_060_63	NULL						1.00	3.80	5.65	3.49	4.42
b8j24_110_2382	NULL						1.20	1.00	1.15	1.14	1.09
NCU01318.1__4_196_RevCom	NULL						1.23	1.27	1.14	1.00	1.18
NCU01427.1__1_304	NULL						1.00	9.15	2.68	2.08	2.58
NCU02440.1__NCU02441.1__2_592	NULL						1.00	2.45	1.54	1.64	1.73
NCU09301.1__3_429	NULL						1.00	2.65	1.93	1.53	1.71
xnc105_090_1168	NULL						1.00	16.20	5.99	1.55	3.32
1nc100_410_28	NULL	1.45		1.97	1.69	1.70	2.38	1.11	2.27	1.39	1.00	1.11
1nc140_100_51	NULL	1.05		1.04	1.12	1.09	1.33	1.04	1.00	1.11	1.09	1.47
1nc580_360_448	NULL	2.48		2.46	3.17	3.32	2.60	1.79	1.00	1.53	1.75	1.74
4nc400_250_526	NULL	1.59		1.48	1.73	1.84	1.63	1.74	1.00	1.40	1.75	2.07
7nc508_050_183	NULL	1.36		1.00	1.29	1.68	1.63	1.24	1.37	1.47	1.36	1.42
7nc508_50__1_299	NULL	1.31		1.00	1.28	1.69	1.78	1.31	1.20	1.38	1.41	1.35
b13i18_160_1955	NULL	1.09		1.13	1.13	1.01	1.03	1.20	1.15	1.16	1.15	1.00
mito_050_403	NULL	1.35		1.62	1.79	1.75	1.46	1.00	1.32	1.47	1.24	1.36
mito_060_155	NULL	1.52		1.91	1.78	2.39	2.07	1.41	1.52	1.46	1.18	1.00
mito_070_114	NULL	1.18		1.60	1.53	1.43	1.32	1.00	1.16	1.30	1.17	1.18
mito_155_743	NULL	2.27		3.72	3.33	2.62	2.52	2.32	1.00	2.29	2.30	2.24
mito_190_78	NULL	1.24		1.70	1.63	1.64	1.33	1.00	1.00	1.52	1.50	1.06
mito_200_732	NULL	1.59		1.73	1.75	1.82	1.43	1.31	1.32	1.43	1.41	1.00
mito_210_895	NULL	1.68		2.25	2.50	2.08	1.62	1.13	1.00	1.24	1.20	1.03
mito_220_782	NULL	1.93		2.42	2.26	2.20	2.11	1.84	1.00	1.48	1.33	1.09
mito_230_708	NULL	1.24		1.86	1.88	1.54	1.37	1.15	1.00	1.26	1.17	1.05
NCU01318.1__1_473	NULL	1.50		1.10	1.26	1.38	1.52	1.03	1.80	1.21	1.00	1.51
NCU01426.M__NCU01427.M__1_103	NULL	1.01		1.10	1.07	1.00	1.07	1.23	1.15	1.13	1.15	1.07
NCU02428.M__NCU02429.M__1_306	NULL	1.23		1.19	1.17	1.36	1.00	1.13	1.34	1.88	2.12	2.24
NCU07144.1__2_53_RevCom	NULL	1.00		1.01	1.04	1.05	1.13	1.29	1.09	1.22	1.30	1.15
NCU09494.1__3_246_RevCom	NULL	1.25		1.07	1.07	1.44	1.36	1.02	1.39	1.11	1.00	1.14
NCU09638.1__4_598	NULL	1.25		1.13	1.24	1.31	1.56	1.00	1.65	1.33	1.35	1.20
xnc035_030_910	NULL	1.20		1.33	1.27	1.36	1.47	1.00	1.38	1.27	1.33	1.21
17e5_350_197	NULL	1.06		1.25	1.13	1.47	1.67	1.00	1.97	1.54	1.51	2.00
18a7_160_649	NULL	1.04		1.04	1.09	1.29	1.20	1.00	1.45	1.20	1.00	1.44

Table E1 (Continued)

Systematic name	Broad name v 7.1	0 hr	2 hr	4 hr	8 hr	10 hr	12B	12T	14T	18T	24 hr
1nc100_430_186	NULL	1.25		1.31	1.31	1.42	1.53	1.00	1.67	1.59	1.32	1.39
1nc340_030_571	NULL	1.56		1.93	2.28	2.90	2.63	2.58	1.00	1.97	2.56	3.07
1nc360_080_381	NULL	1.04		1.06	1.06	1.17	1.34	1.00	1.51	1.44	1.37	1.35
1nc542_010_0	NULL	1.16		1.57	1.51	2.00	2.69	2.33	1.00	1.13	1.78	2.03
1nc549_050_224	NULL	1.15		1.11	1.24	1.35	1.55	1.00	1.47	1.15	1.20	1.21
1nc725_100_108	NULL	1.33		1.22	1.33	1.67	1.99	1.00	1.73	1.40	1.38	1.87
2nc610_080_66	NULL	1.00		1.14	1.32	1.73	1.53	1.10	1.21	1.14	1.21	1.28
3nc250_290_424	NULL	1.05		1.00	1.06	1.41	1.73	1.02	1.91	1.56	1.48	1.26
3nc425_010_338	NULL	1.00		1.01	1.15	1.36	1.57	1.19	1.87	1.43	1.45	1.68
3nc435_040_263	NULL	1.05		1.00	1.02	1.48	1.79	1.19	1.55	1.70	1.26	1.37
3nc700_090_1319	NULL	1.00		1.11	1.03	1.15	1.30	1.43	1.57	1.72	1.75	1.89
4nc400_230_745	NULL	1.53		1.68	1.79	2.23	2.15	1.93	1.00	1.47	1.72	2.07
6nc105_190_171	NULL	1.21		1.40	1.32	1.32	1.28	1.00	1.66	1.34	1.38	1.21
6nc105_200_84	NULL	1.27		1.30	1.35	1.64	1.81	1.00	2.23	1.63	1.66	1.44
7nc450_120_194	NULL	1.00		1.15	1.22	1.32	1.29	1.61	1.62	1.48	1.37	1.41
b13b3_150_70	NULL	1.00		1.05	1.02	1.13	1.05	1.05	1.29	1.39	1.22	1.47
b13h18_260_50	NULL	1.19		1.26	1.31	1.47	1.79	1.00	2.39	2.00	1.82	1.83
b21o8_070_43	NULL	1.15		1.14	1.15	1.44	1.78	1.00	2.32	1.39	1.40	1.33
b24n11_270_505	NULL	1.00		1.03	1.10	1.43	1.64	1.19	2.08	1.80	1.60	1.40
b4b2_050_622	NULL	1.00		1.00	1.06	1.11	1.11	1.16	1.50	1.15	1.11	1.09
b8j22_205_32	NULL	1.17		1.10	1.07	1.51	1.66	1.00	2.34	1.99	1.60	1.32
mito_090_1064	NULL	1.83		4.10	3.67	2.68	2.30	2.15	1.00	2.25	2.20	1.83
mito_195_660	NULL	1.11		1.89	1.95	1.90	1.78	1.85	1.00	1.75	1.85	1.56
mito_240_428	NULL	1.64		3.02	3.15	3.22	2.90	2.87	1.00	2.68	2.51	2.08
NCU01193.M__NCU01194.1__6_432_RevCom	NULL	1.30		1.58	1.47	1.42	1.46	1.00	1.66	1.44	1.48	1.31
NCU01195.M__NCU01196.M__5_38	NULL	1.14		1.21	1.00	1.57	2.07	1.76	2.52	1.54	1.49	1.72
NCU02265.M__NCU02266.M__3_67_RevCom	NULL	1.23		1.35	1.36	1.75	1.61	1.00	1.66	1.67	1.30	1.31
NCU02432.1__3_267_RevCom	NULL	1.13		1.20	1.26	1.54	1.71	1.00	2.14	1.55	1.51	1.38
NCU02470.M__NCU02471.1__2_521_RevCom	NULL	1.00		1.01	1.15	1.09	1.05	1.11	1.32	1.23	1.20	1.11
NCU03140.1__NCU03141.M__1_188	NULL	1.00		1.03	1.07	1.02	1.08	1.09	1.58	1.52	1.26	1.22
NCU07146.1__4_572_RevCom	NULL	1.31		1.33	1.30	1.52	1.54	1.16	1.55	2.82	1.00	1.26
NCU07263.M__NCU07264.M__1_171	NULL	1.00		1.13	1.20	1.22	1.43	1.72	1.35	1.53	1.59	1.37
NCU08410.1__1_214	NULL	1.36		1.36	1.45	1.56	1.68	1.00	1.70	1.56	1.57	1.55
TelVR_NCU07144.1__4_200_RevCom	NULL	1.00		1.15	1.28	1.31	1.28	1.42	1.58	2.18	1.34	1.30
xnc018_040_1213	NULL	1.25		1.97	1.93	1.87	1.93	1.60	1.00	1.78	1.50	1.36
xnc043_060_44	NULL	1.17		1.16	1.17	1.03	1.36	1.00	1.93	2.52	2.55	1.72
xnc085_170_281	NULL	1.99		2.56	1.88	1.75	1.90	1.00	3.01	4.16	2.78	2.40
xnc149_010_214	NULL	1.21		1.37	1.19	1.46	1.73	1.00	2.22	1.65	1.51	1.45
20h10_050_1172	NULL	1.00		1.45	1.39	2.58	4.21	1.28	4.92	2.56	2.19	2.68
2nc820_030_335	NULL	1.00		1.00	1.02	1.43	1.51	1.30	1.75	2.37	2.33	1.80
3nc415_100_91	NULL	1.00		1.12	1.08	1.79	2.01	1.21	2.53	2.20	2.02	2.08
6nc140_200_539	NULL	1.02		1.20	1.25	1.45	1.84	1.00	2.27	1.93	1.74	1.43
b11e5_200_233	NULL	1.00		1.31	1.38	1.59	2.09	1.25	2.22	1.69	1.56	1.47
b11o9_040_207	NULL	1.00		1.62	1.86	1.86	2.02	1.85	6.25	5.65	1.96	2.07
NCU01425.M__NCU01426.M__1_123	NULL	1.00		3.03	1.20	1.40	1.57	1.14	2.11	1.99	1.33	1.42
NCU02356.M__NCU02357.M__5_540	NULL	1.00		1.30	1.19	1.87	2.76	1.00	4.15	3.15	2.24	2.50
NCU02428.1__2_118	NULL	1.13		1.03	1.15	1.85	2.28	1.00	3.79	2.67	2.66	2.62
NCU02437.1__1_450	NULL	1.28		1.00	1.11	1.75	3.26	1.13	4.14	3.55	1.72	1.89
NCU03139.M__NCU03140.1__1_358	NULL	1.00		1.68	1.42	2.29	3.74	1.21	5.72	3.95	2.46	2.87
NCU05809.1__1_248	NULL	1.16		1.39	1.09	1.78	1.95	1.00	3.12	2.57	2.06	2.71
NCU07148.1__NCU07149.M__1_187	NULL	1.08		1.12	1.14	1.30	1.74	1.00	2.48	2.17	1.72	1.47
NCU07267.1__1_405	NULL	1.00		1.10	1.08	1.61	1.59	1.25	1.77	2.07	1.97	2.36
3nc440_690_28	NULL	1.00		7.56	5.33	3.19	2.90	3.83	1.01	2.42	2.70	1.85
6nc350_110_143	NULL	1.00		12.65	6.34	5.96	7.11	16.25	2.22	5.82	7.05	5.23
NCU01427.1__2_451_RevCom	NULL	1.00		3.31	2.86	3.49	5.35	2.00	8.24	4.35	1.68	2.93
b24a11_170_682	NULL	4.19		3.14	3.45	2.41	1.76	1.96	1.00	1.73	1.96	1.91
NCU01197.1__1_575	NULL	3.03		1.49	1.73	1.78	1.55	1.57	1.43	1.00	1.02	1.89
NCU01317.1__1_74	NULL	6.17		5.13	5.20	4.32	2.77	3.41	1.00	3.63	3.54	3.47
NCU05810.1__1_435	NULL	8.64		6.23	7.24	4.17	2.84	2.75	1.00	2.90	3.11	2.83

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